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Surface mine spoil reclamation in southeastern Kansas

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SURFACE MINE SPOIL RECLAMATION

IN SOUTHEASTERN KANSAS

by

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CHAPTER I

INTRODUCTION

More than 55,000 acres of land in Southeastern Kansas has been disturbed by surface mining. About 43,000 acres of this has been left to plague local communities with problems of soil erosion, scenic devastation and loss of agriculture production.

However bleak the prospects may appear when the giant shovels move on, the future of strip-mined areas is not hopeless. This apparent desolation need not be permanent, because it is possible to reclaim most of this land, improve its appearance and restore it to beneficial use.

Strip mining goes by many names. The mining firms do not like the term "strip mining" because it has come to carry an unpleasant connotation. "Surface mining" is more acceptable to them. It has been generally defined to cover all types of mining on the surface of the earth as opposed to deep mining which is underground. Terms used to describe the aftermath of surface mining include: spoil bank, dumps, strip areas, strip banks, strip land, strippings, pitted lands and strip mined lands.

Historically the resulting problems from surface mining have been treated on an individual basis. Due to the overwhelming expense of reclaiming strip land, little was treated. As the size, complexity

and general public concern of the problem grew, new and different aproaches to financing the reclamation work were sought.

The aim of this paper is to present a complete sketch of the historical development and operations of strip mining in Southeastern Kansas. An effort will be made to describe the strip mine reclamation task. Early recognition of the need and efforts to do something about the problem and enactment of state legislation that now requires mining companies to restore the land will be discussed. Co-operative efforts of certain local, state and federal agencies have developed to help landowners treat the strip mined land. These efforts will be described in detail.

Our purpose in preparing this paper was to demonstrate how a seemingly insurmountable task has finally gotten off dead center and how the co-operative efforts of many concerned people, through an organized effort, have brought about a complete change of attitude on the part of many landowners and others. Although there is still a big job ahead, no longer does the task of strip mine reclamation in Southeastern Kansas appear hopeless.

CHAPTER II

HISTORY OF STRIP MINING IN SOUTHEASTERN KANSAS

The Kansas Geological Survey publication, Town and Minerals in Southeastern Kansas, gives the following account of the history and growth of the coal industry.[1] Coal had been mined in Kansas since before the Civil War. By 1890, it was the most valuable mining product in the State and was centered in Crawford and Cherokee Counties. In 1911, coal contributed 38 percent of a product valued at $25 million. By 1929, cement and zinc were both more important than coal production.

Zinc smelting from about 1872 until 1895-1900 was accomplished by the use of coal-produced heat. The conversion to natural gas was all but completed by 1901 when only the smelter at Girard utilized coal. By 1910, deplenishing gas pools forced glass, cement and zinc smelters to once again turn to coal to fire their smelters.

The Cement industry completed its conversion from gas to coal between 1912 and 1915. Coal-burning predominated in the next decade. Irregularity in the supply of coal hampered cement plant operations. Shortages of railroad cars delayed delivery periodically while strikes and coal embargos added to uncertainty. By 1922-1923, with the open-

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[1]John G. Clark, Towns and Minerals in Southeastern Kansas, (Lawrence, Kansas: State Geological Survey of Kansas, Special Distribution Publication 52, 1970), pp. 16-132.

ing of new gas and oil fields in Southwestern Kansas, Oklahoma, and Texas, most of the companies in Kansas happily abandoned coal-burning and once again turned to the use of gas and some oil as kiln fuel.

Evolvement of The Strip Mining Process

The Southeastern Kansas coal field (chiefly in Crawford and Cherokee Counties, but partly in Bourbon and Labette Counties) is the oldest and most important coal mining area in Kansas. Most of the coals are thin and considerable overburden must be removed in mining them.

It was during the period of 1910-1915, that strip mining became prominent in Southeastern Kansas. The State Coal Mine Inspection Department reported at the end of fiscal year 1913:

> The stripping of coal by means of steam shovels has developed quite rapidly. During the fiscal year ended June 30, 1913, there were 301,621 tons of coal produced in this way. The pits, including horse pits, gave employment to 439 men and worked on an average of 185 days. There were eleven companies engaged in this line of business during the year each company owning and operating from one to four steam shovels.[2]

The October issue of Coal Age magazine, although centering on the Pittsburg and Midway Coal Company, typified the growth and development of the strip mine industry in Southeastern Kansas.[3]

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[2]Coal Mine Inspection Department, Report of the Department for year ending June 30, 1913, (Topeka, Kansas, 1913), p. 9.

[3]Ivan A. Given, ed., "The Pittsburg and Midway Coal Mining Company", Coal Age, October, 1966, pp. 83-87.

In 1885, Pittsburg and Midway's output was a mere 15,276 tons from three quite-small mines in Southeastern Kansas. All the operations were at or near Midway, Kansas.

In 1899, P&M Production reached 254,495 tons and then began dropping to 54,583 tons in 1910. In 1910, Charles F. Spencer, the new P&M President, got his first strip mining experience when he and some other associates installed a 1 1/2 cubic yard steam shovel.

Counted as major milestones in P&M growth in Kansas were the following:

> 1918 - Installation of one of the first electric shovels in the industry - a six cubic yard dipper at the new number 10 mine near Midway, Kansas.
>
> 1927 - Installation of the first ten cu. yd. electric shovel ever built, also at mine number 10.
>
> 1929 - Another first in shovel size with the installation of a 750 - B at mine number 10. This machine finally was retired in 1964 after digging material, in Kansas and Kentucky, equivalent to that handled in building the Panama Canal.
>
> 1938 - Mine number 15 was equipped with a 33 cu. yd. electric shovel, then the largest in the world.
>
> 1963 - A shovel with a 90 cu. yd. dipper, christened 'Brutus' and fourth in size of all shovels built to that date, was put into operation at mine number 19, at Hollowell, Kansas. Its installation added nearly 30 years to the life of mined areas. Haulage equipment at No. 19 includes 90 to 100 and 120 ton semi-trailers.[4]

The Topeka Capitol Newspaper of September 12, 1915, stated:

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[4] Ibid.

> In the Pittsburg strip pit territory forty-two steam shovels now are being operated. Roughly speaking, each shovel will uncover about an acre of coal a month, if it works regularly. A shovel of this type has a dipper that picks up five cubic yards of earth at a time. Practically all of the coal shovels are as large or larger than those used to dig the Panama Canal.

Even at this stage of the game there was some concern about restoring the stripped land to beneficial use. The article goes on to state: "The problem, of course, is to get the land level for cultivation purposes. It is believed that this work can be done at small expense."

Today all the coal mined in the area is by the strip mining methods.

CHAPTER III

STRIP MINING, ITS NATURE, EXTENT AND SIGNIFICANCE

Nature

Stated in the simplest terms, strip mining consists of nothing more than removing the topsoil and other overburden that lie above the coal deposits and then removing the seam of coal. In practice, however, the process is considerably more complex.

Area strip-mining is practiced on the relatively flat terrain of Southeastern Kansas. A trench, or "box cut", is made through the overburden to expose the coal seam which is to be removed. As each succeeding parallel cut is made the overburden is placed in the cut just previously excavated. The final cut leaves an open trench as deep as the thickness of the overburden plus the coal removed, bounded on one side by the last spoil bank and on the other by the undisturbed high-wall. These "final cuts" fill with water and in a short time form long lakes or ponds. Area stripping, unless graded or leveled, resembles the ridges of a giant washboard. The series of more or less parallel ridges, known as dumps, vary from 50 to 75 feet apart. Narrow valleys are formed between these ridges and the depth of the valleys range from 10 to 30 feet.

Figure 1 (L. J. "Jim" Gaskell Photo)
The city of Pittsburg, Kansas uses mined land as a sanitary landfill area. After solid waste is covered, the area is fairly level.

Figure 2 (L. J. "Jim" Gaskell Photo)
Fred Galvanni has 200 acres of this type of mined land in Crawford County. Mining by dragline some 30 years ago left large cone shaped spoils about 50 feet high instead of uniform ridges. The dozer starts work on a 20 acre demonstration area.

Figure 3 (L. J. "Jim" Gaskell Photo)
Leon Epler, Cherokee County owns 500 acres of land, of which 155 acres has been strip mined. This 25 acre demonstration is his first redevelopment effort. The area in the background is typical of undeveloped mined land.

Figure 4 (L. J. "Jim" Gaskell Photo)
Dorothy Parker, Crawford County was among the first to develop a recreation complex on re-developed mined land. Overnight camping and fishing are featured activities on this demostration site.

Aerially, the coal field exhibits a patchwork of stripped and non-stripped lands (see figure 5). One natural factor for this was the wide stratigraphic separation of the gently dipping coal seams. The other cause for the scattered pattern of stripped sites was the availability of land for purchase in the past by coal companies.

Soils Of The Strip Mine Areas Of Kansas

The soils of the strip mine areas vary in thickness from a few feet to tens of feet over shale and sandstone bedrock. The shallow soils, for the most part, have formed from clayey shales. The very deep soils have fomred in stream alluvium (deposits) of recent to very old age.

The Reconnaissance Soil Conservation Survey completed by the Soil Conservation Service in December 1940, describes the mined lands as falling into capability Class VIII. Class VIII is described as consisting of mine dumps, barren rocks, and other land not suitable for cultivation, grazing, or woodland use.[1]

Once an area has been strip mined it is rendered virtually useless for growing any thing other than possibly wildlife cover and this possibility only after a period of as many as five years.

Raw spoil banks can scarcely be called soil. Usually the result-

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[1]U.S. Department of Agriculture, Soil Conservation Service, Reconnaissance Soil Conservation Survey, Crawford County, Kansas, Washington, D. C., Oct. 1947.

SOIL SURVEY DATA

Soil boundary and symbol ..... Dx

Gravel .....

Stoniness { Stony ..... / Very stony .....

Rock outcrops .....

Chert fragments .....

Clay spot .....

Sand spot .....

Gumbo or scabby spot .....

Made land .....

Severely eroded spot .....

Blowout, wind erosion .....

Gully .....

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

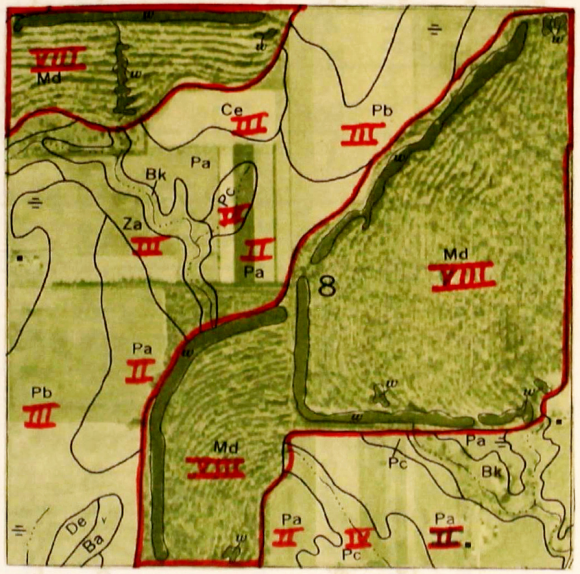


Figure 5
Soil Survey map on a typical section of land showing the contrast between strip-mined land (outlined in red) and adjoining agricultural land.

CRAWFORD COUNTY, KANSAS

SOIL LEGEND

SYMBOL	NAME
Ba	Bates loam, 1 to 4 percent slopes – IIe2
Bb	Bates loam, 1 to 4 percent slopes, eroded – IIIe6
Bc	Bates loam, 4 to 7 percent slopes – IIIe6
Bd	Bates loam, 4 to 7 percent slopes, eroded – IVe2
Be	Bolivar-Hector complex, 5 to 12 percent slopes – VIe6
Bk	Breaks-Alluvial land complex – VIe5
Ce	Cherokee silt loam – IIIw6
Cf	Clareson flaggy silty clay loam, 0 to 3 percent slopes – VIe
De	Dennis silt loam, 1 to 4 percent slopes – IIe1
Df	Dennis silt loam, 1 to 4 percent slopes, eroded – IIIe4
Dg	Dennis silt loam, 4 to 7 percent slopes – IIIe4
Dh	Dennis silt loam, 4 to 7 percent slopes, eroded – IIIe8
Dp	Dennis-Parsons silt loams, 1 to 4 percent slopes – IIIe18
Er	Eroded land, 3 to 10 percent slopes – VIe5
Gd	Girard silty clay loam – IIIw3
He	Hepler silt loam – IIw2
Ls	Lula silt loam, 1 to 3 percent slopes – IIe1
Lt	Lula silty clay loam, 1 to 3 percent slopes, eroded – IIIe6
Lu	Lula-Clareson complex, 1 to 3 percent slopes – IIIe1
Mc	McCune silt loam – IIw2
Md	Mine pits and dumps – VIII
Os	Osage clay – IIIw3
Pa	Parsons silt loam, 0 to 1 percent slopes – IIs4
Pb	Parsons silt loam, 1 to 3 percent slopes – IIIe15
Pc	Parsons silt loam, 1 to 3 percent slopes, eroded – IVe6
Ra	Radley silt loam – I
Rh	Radley-Hepler silt loams – VIw1
Rn	Ringo silty clay, 3 to 9 percent slopes – IIIe9
Ro	Ringo silty clay, 3 to 9 percent slopes, eroded – IVe3
Rp	Ringo complex, 9 to 15 percent slopes – VIe7
Za	Zaar silty clay, 1 to 3 percent slopes – IIIe4

ing "soil" is a conglomerate of soil, clay, shale, and rocks, loosely piled and without structure. Figure 5 illustrates the manner in which mined land is classified into capability units by Soil Scientists of the Soil Conservation Service. This soil survey map of Crawford County places the mined land in capability Class VIII which is described as land not suitable for cultivation, grazing, or woodland use. Soils adjoining the mined area are capability Class II and III, land which is suitable for continuous cultivation with properly applied conservation systems. The surface of these soils prior to mining is a level or nearly level, Cherokee, Neosho or Parsons silt loam.

Hence, some 46,000 acres of Class I, II and III agricultural land in Southeastern Kansas has been "converted" to relatively worthless heaps of shale through the strip mining process.

Extent

For the purpose of this section the extent of mined land is defined as land whose surface has been disturbed by strip mining of coal prior to January 1, 1969, the effective date of the Kansas Mined Land Conservation and Reclamation Act. The acreage disturbed by strip mining of coal prior to January 1, 1969, is summarized in Table 1, page 15. The ownership of land strip mined for coal is summarized in Table 2, page 16. Land owned by individuals and strip mined for coal prior to January 1, 1969, is shown in Table 3, page 17. The areas

TABLE I

Surface Acreage Disturbed by Strip Mining of Coal
Prior to January 1, 1969 (in Acres).[1]*

Strip Mined for Coal	
Bourbon County	3,000
Cherokee County	20,000
Crawford County	22,000
Labette County	1,000
Total	46,000

[1]Figures are approximate and rounded for convenience.
*Source-Mined Land Task Group

TABLE II

Ownership of Land Strip-Mined for Coal (in Acres)*

	Cherokee[1]	Crawford[2]	Bourbon[3]	Labette[3]	Total	Percent
Individual	11,250	15,400	2,700	850	30,250	68
Mining Companies:						
Clemens Coal Co.		5,300	200			
Gulf Oil Co.	5,500				11,000	24
State Of Kansas	2,100	1,250			3,350	7
Cherokee County Sportsman Club	350				350	1
Total	19,200	21,950	2,900	850	44,950	100

[1]Based upon Cherokee County property-tax records, March 1970.
[2]Conservative estimates, from Crawford County Property-tax records, June, 1970.
[3]Based upon 1963 aerial photos and 1963 land ownership maps.
*Source-Mined Land Task Group.

TABLE III

Land Owned by Individuals: Areas Strip-Mined for Coal
Prior to January 1, 1969 *

	Number of Owners	Acres			Percent of Total Which is Water
		Total	Land	Water	
Strip-Mined for Coal:					
Crawford	203	15,424	14,522	902	5.9
Cherokee	130	9,484	8,680	804	8.5
Bourbon[1]	74	2,972	2,896	76	2.6
Labette	19	829	793	36	4.2
Total	426	28,709	26,891	1,818	6.3

[1]Includes 166 acres owned by coal companies.
*Source-Mined Land Task Group

Note: Ownership of lands disturbed is determined from property tax records and land-ownership maps. Differences in acres recorded in Tables 2 and 3, especially for Cherokee County, are due to acreage differences in the tax records and land-ownership maps. These differences are being resolved.

are further divided as to land and water. The total acreage needing reclamation can only be approximated because definitions of "reclamation" are a matter of individual judgment.

From a survey conducted by the Soil Conservation Service, it is concluded that probably only 10% of the total acreage disturbed by strip mining in Bourbon, Cherokii, Crawford and Labette Counties, had been adequately reclaimed as of January 1, 1972. Thus, about 90% of the acreage (43,300 acres) still require some remedial attention. Estimates obtained by the Soil Conservation Service are given in Table 4, page 19. The expanse of this acreage needing conservation treatment may be more readily grasped if it is visualized as a strip a mile wide and extending from Kansas City to Topeka, a distance of some 70 miles. Figure 6, page 20, illustrates the distribution of mined areas in Southeastern Kansas. As stated previously, that acreage disturbed annually since January 1, 1969 (approximately 755 acres) must be restored to beneficial use by the mining companies.

Significance - Impact on the Environment

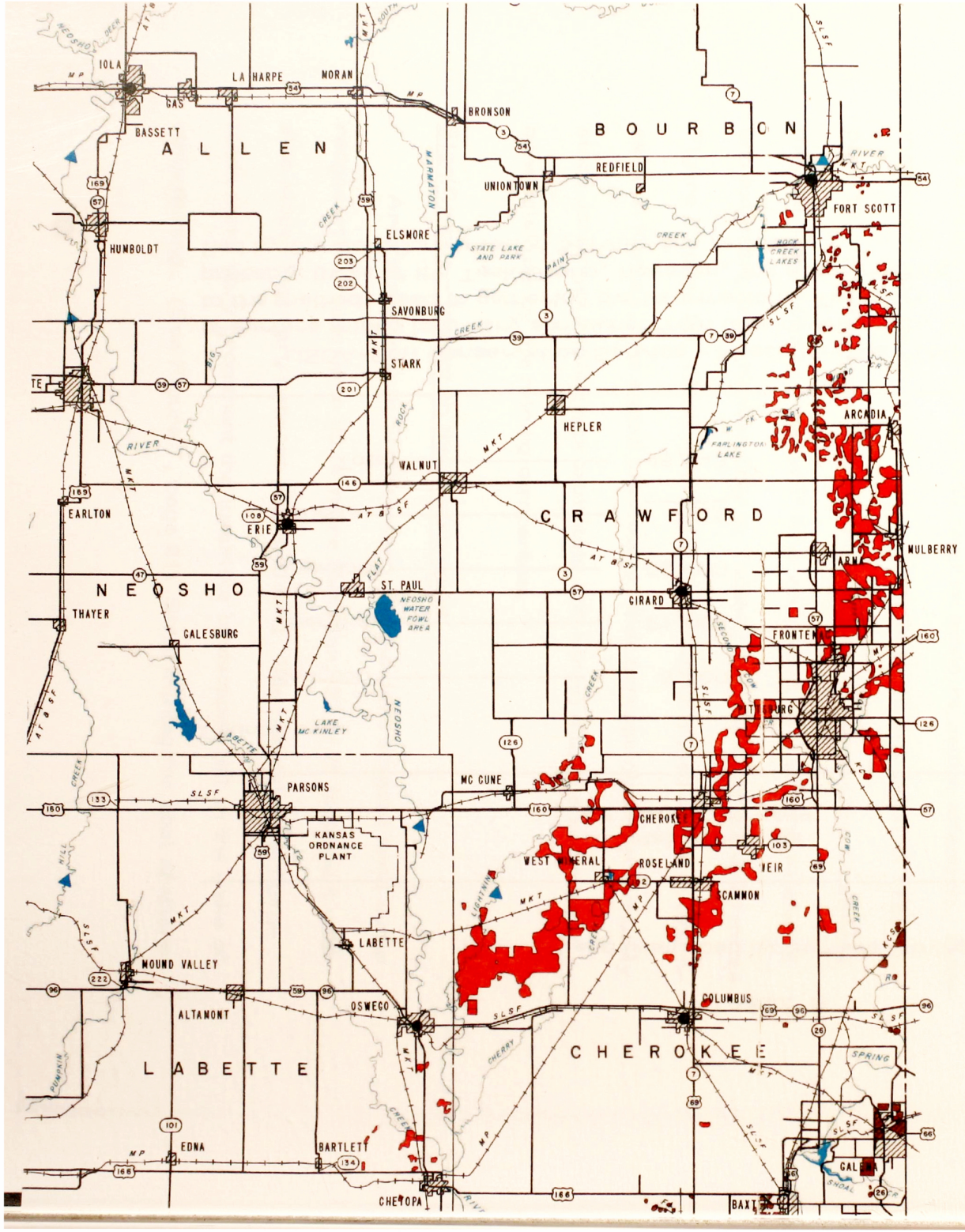
Area strippings in Southeastern Kansas have created spoil dump redges with crests up to 30 or more feet high, 50 to 75 feet apart with side slopes that vary between 20% and 40%. The natural level farmlands make very prominent the lunarlike landscapes left in the wake of strip mining. (See Figure 7, page 21) Strip mining for coal shatters

TABLE IV

Land Disturbed by Surface Mining*

	Total Acres, as Of January 1, 1972	Acres Needing Conservation Treatment
County:		
Bourbon	3,000	2,000
Cherokee	21,000	18,900
Crawford	23,000	22,000
Labette	913	400
Total	48,443	43,300

*USDA-Soil Conservation Service - Miscellaneous Publication No. 1082. The acreages of surface mined land vary somewhat from data developed by the Mined Land Task Group due to the methods used in gathering the information. The more reliable figures on total area are probably those of the Task Group, however, the acres needing conservation treatment as supplied by the Soil Conservation Service are reliable.



LEGEND

- STATE BOUNDARY
- COUNTY BOUNDARY
- COUNTY SEAT
- INCORPORATED TOWN
- DRAINAGE
- LAKE
- U.S. HIGHWAY
- STATE HIGHWAY
- HARD SURFACE ROAD
- RAILROAD
- STREAM GAGE
- LAND MINED FOR COAL
- LEAD AND ZINC TAILINGS

SURFACE MINED AREAS

SEE-KAN

RESOURCE CONSERVATION AND DEVELOPMENT PROJECT
KANSAS

SCALE 1:500,000

SCALE 5 0 5 10 MILES

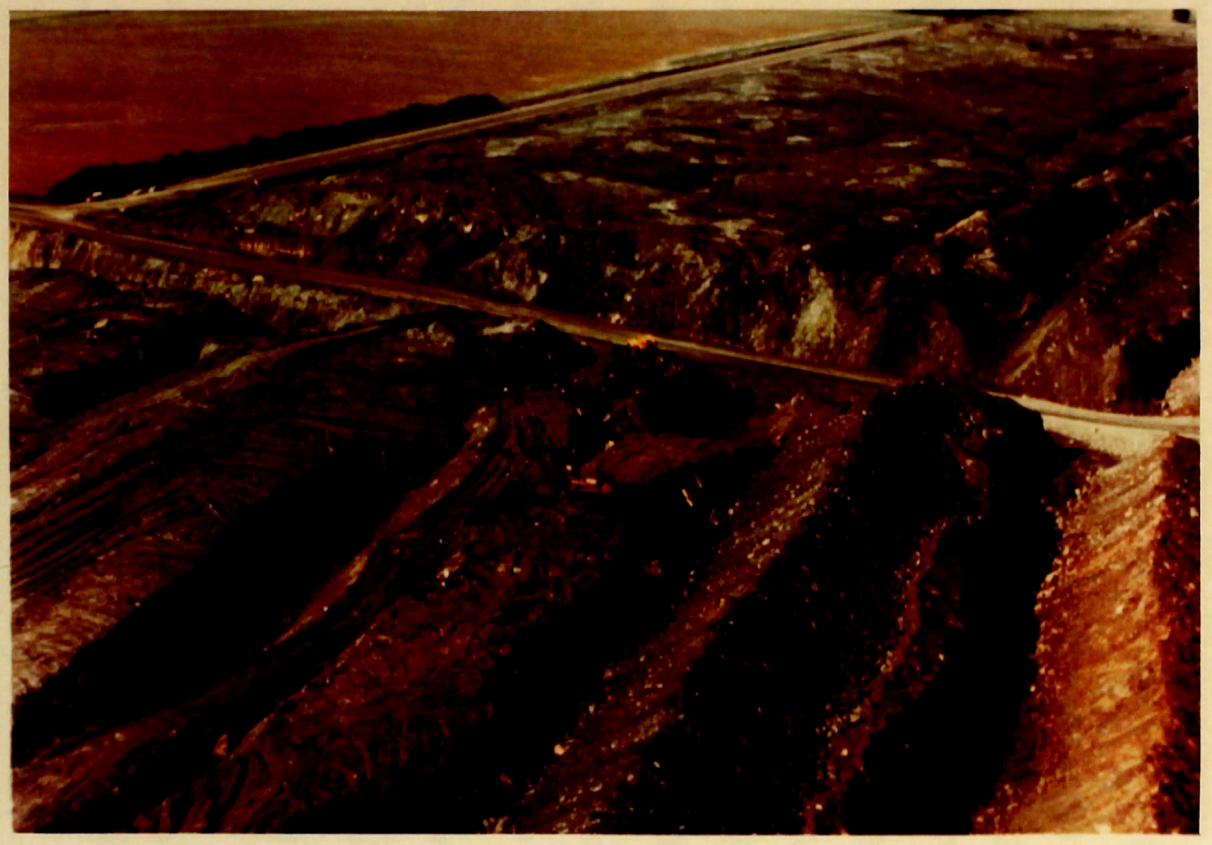


Figure 7 (Pittsburg & Midway Coal Mining Co. Photo)
After mining operations have been completed, dozers begin the work of grading and shaping the lunarlike landscapes that are left. Naturally level farmland can be seen in the background.

the ecological balance with finality. All life flees or is buried and the spoil lies naked for five years or more before any natural revegation restores a protective cover. These are external costs of strip mining coal.

Contrary to most publicized reports about the great amount of damage caused from strip mine sediments, this is not true in Kansas. By far the greater part of the excavation of the strip mined lands is shale. As the shale piles weather, a protective surface of broken shale holds most of the material in place. The sediment that is released generally finds its way back into the valleys between the ridges and into the strip pits.[2]

Economic Loss

Prior to 1969, when a landowner made the decision to lease his land for strip mining, he, in effect, agreed to render the land useless for agriculture production for all time, unless reclamation was planned. Consider, for example, the money loss occuring from the problem. The average wheat yield in the area is 37 bushels per acre. Assume the reclaimed land would produce one-half that amount or 18 bushels per acre. At $3.00 per bushel, this represents a loss in gross income of $2,328,200 from the 43,300 acres that need reclamation.

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[2]Personal conversation with Richard Holland, Geologist, SCS, Salina, Kansas, August, 1973.

The estimated net return from an 18 bushel wheat crop is about $21.00 per acre.[3] The output of all Kansas industries increases by about $1.38 when the wheat industry increases its output by $1.00.[4] If wheat production were to increase by $909,300.00 (43,300 acres @ $21.00), total output of all Kansas industries would increase by $1,254, 834.00 annually.

Land disturbance caused by mining results in erosion of the county tax base. Following strip mining, the average appraised value of land drops from $150.00 to $10.00 per acre in Cherokee County and from, $160.00 to $40.00 per acre in Crawford County. The tax loss to the two counties on some 42,000 acres of strip mined land amounts to approximately $80,000.00 per year.[5] The Chanute, Kansas Tribune of March 16, 1972, described the situation this way:

> Consider the parts of Southeast Kansas that have been raped by strip mining. The jobs are gone, the land is useless, the tax burden normally spread broadly falls on the unhappy survivors. Only after mined land is restored is there honest hope for future prosperity.

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[3]Based upon 18 bushels @ $3.00/bu. ($54.00 gross) less cost of production, including taxes, of $33/acre.

[4]M. Jarvin Emerson, The Interindustry Structure of the Kansas Economy, Kansas Department of Economic Development, Topeka, 1969, p. 145.

[5]Kathleen Q. Camin, Ronald G. Hardy and William W. Hambleton, Mined-Land Redevelopment, Southeast Kansas Portion of the Ozarks Region, 1970, 1971, p.3.

Beneficial Aspects

The economic potential of Southeastern Kansas, like most areas, is founded primarily upon its soils, its water and its mineral deposits. The importance of coal strip mining to the Kansas economy is easily measured. Since 1964, the annual output from the coal industry has averaged about 1,267,000 short tons valued at over $6.5 million. Expenditures by the industry include $3.70 per ton paid to the railroads for transporting coal and $4.85 per hour in wages to an average of 235 employees in Kansas.[6]

Surface mining has created many opportunities to develop recreational areas where none existed before. The water areas that are formed as a result of strip mining vary in size from a fraction of an acre to ten or more and provide excellent fishing, some boating and adjoining areas are used as favorite picnicking spots. Several private recreation developments exist throughout the area. The Kansas Forestry Fish and Game Commission manages 6,470 acres of strip mined land for public hunting, fishing, picnicking, camping and other forms of outdoor recreation. The Cherokee County Sportman's Club owns 350 acres of strip mined land for use of its members.

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[6]Ronald G. Hardy, personal letter, January 14, 1974.

CHAPTER IV

EARLY CONCERN AND EFFORTS TO RETURN STRIP-MINED LAND TO BENEFICIAL USE

Pre-1967 Efforts: Early Orchard and Vineyard Plantings

Among the earliest attempts to reclaim the spoilbanks of the region were the growing of orchards and vineyards. The result was that many thousands of fruit trees were planted and several relatively large orchards were established. In 1928, Mr. Adolph Kurent began the planting of what soon came to be the largest orchard and vineyard in the entire strip mined area, comprising more than 40 acres of unleveled spoilbanks. It included every variety he was able to secure that was considered adapted to the region. Other sizable orchard projects which were established early, 1930-1939, are mentioned in a report by Wells.[1] They include: one by H. H. Spencer, near Gross; one by Mackie-Clemens Coal Company, near Foxtown; one by C. C. Reichenbach, near Foxtown; one by G. H. Rocker, near Pittsburg; and one by Bert Steve, near Frontenac.

In 1940-1941, the "Fleming Project", an experimental orchard and vineyard containing more than 180 varieties of fruits, grapes, and

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[1] J. Ralph Wells, The Reclamation of Stripmined Areas in Southeastern Kansas. Transactions Kansas Academy of Science, Vol. 56, No. 3, 1953, p. 278.

berries, was established on stripped areas of a 79 acre tract of state owned land which was leveled by the Civilian Conservation Corps during the period 1933-1937. The last sizable project of orchard and vineyard planting on spoilbanks comprises a small vineyard and 1,200 fruit trees planted in 1947 by the Pittsburg and Midway Coal Company in Cherokee County, chiefly as an experiment.[2]

In an attempt to evaluate the role of orchards and vineyards in returning strip mined land to profitable production, all the above listed plantings were examined by Wells and the owners interviewed as to their experiences and views.[3] The results seem significant. On the basis of his findings Wells concluded:

> The use of orchards and vineyards for reclaiming strip mined lands has ceased almost completely and offers little hope for success in the near future, even though many varieties of fruits and grapes grow well and produce an excellent quality of fruit, often in a shorter than usual time. Seven of the nine sizable plantings known to have been established for this purpose, have been abandoned, or are in such a state of neglect that they are rapidly deteriorating. None is being replaced, or is considered by its owner to be a profitable venture because of existing labor and marketing problems as well as the uncertainty of favorable weather conditions.

As far as I am able to determine the practice of planting strip mined land to orchards and vineyards ended, for all practical purposes, in

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[2]Frank J. Foresman, "Stripped Land Rehabilitation." Coal Mine Modernization Yearbook, National Coal Association, Washington, D.C., 1952. p. 7.

[3]Wells, Reclamation, p. 279.

the early 1940's.

Early Reforestation Efforts

The possibility of reclaiming stripped land by the use of forest trees was early and clearly indicated by the fact that volunteer growths of a variety of trees occur on the spoilbanks relatively soon after striping operations are completed. As a result, a number of experimental plantings have been made chiefly under the leadership and cooperation of local leaders; the United States Forest Service, the Soil Conservation Service, and the Civilian Conservation Corps. The latter agency, during the period 1933-1937, leveled or partially leveled approximately 3,400 acres of stripped land in Cherokee and Crawford Counties owned by the State, including the State Quail Farm, the "Fleming Project" and other tracts. Of this total, 2,930 acres were planted with walnut, either alone or in mixtures with other varieties.[4]

In 1940-1941, the National Youth Administration planted several species of trees on the state owned "Fleming Project". Another experimental forest planting was made between 1935 and 1939 by the Mackie-Clemens Coal Company on unleveled and partically leveled spoilbanks. More than 100 pecan trees, paper shell and native, are included in the orchard plantings of C. C. Reichenbach; while smaller numbers of these are found in several widely scattered plantings, ac-

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[4]Wells, Reclamation, p. 282.

cording to Wells.[5]

During the period 1938-1945, the Pittsburg and Midway Coal Company planted approximately 440 acres of walnuts on seven foot centers. Stands obtained, survival, and growth are reported as very good by Hall[6] in 1940, and Foresman[7] in 1952. The same condition is true at the present time.

The role of planted forests in solving the problem of stripped land reclamation is difficult to appraise because of insufficient knowledge of any except walnut. The few available published accounts dealing with the subject in Southeastern Kansas present a rather optimistic prospect for the growing of walnut and black locust forests, but as Dr. Wayne Geyer, was quoted in the Kansas City Star of June 11, 1972:

> . . . growing trees is expensive and takes a lot of time. Tree planting appears to be marginal for the small land owner, who cannot afford to tie up his money for up to 50 years.

The reluctance of land owners to tie up their money in tree plantings is well born out in the foregoing account of the early plantings. One will note that tree planting for wood products was carried out either by coal companies or government agencies and not by individual land owners.

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[5]Ibid., p. 283.

[6]Harry H. Hall, The Romance and Reclamation of the Coal Lands of Southeastern Kansas, Transactions Kansas Academy of Science, Vol. 43, 1940, pp. 57-67.

[7]Foresman, Rehabilitation, p. 7.

Forage and Grazing Crops

Of all the early reclamation efforts in use in Southeastern Kansas, plantings for livestock grazing was the most extensive and apparently the most promising. In 1945, experimental work was carried on by the Pittsburg and Midway Coal Company to determine the adaptability of the strip banks for forage crops. Results obtained after two consecutive years of seeding were successful to such an extent that the company made the decision to rehabilitate all of the land that had been strip mined as pasture land with the exception of a small percentage of land that was unsuitable. As a result, more than 5,000 acres of stripland were eventually seeded for pasture and fenced.[8] John W. Mackie, Jr., President of the Clemens Coal Company of Pittsburg, Kansas, was quoted in the Kansas City Star of June 11, 1972, as saying his company voluntarily has reclaimed 300 acres of mined land and is grazing cattle on fescue pastures. The Sinclair Coal Company, at about the same time, undertook similar experimental work on a large scale. The results of these studies were so successful that both companies expanded the practice and maintained large herds of cattle as profitable ventures, according to their reports.[9,10] Largely as a result of the success of

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[8]Ibid., p. 7.

[9]Ibid., p. 8.

[10]Thomas C. Cheasley, "Reclaimed Strip Areas Produce Quality Cattle". Sinclair Coal Company, Kansas City, Missouri. (Mimeographed).

the above experiments and the publicity given them, numerous similar projects, both large and small, were under way or started in 1953 on Southeastern Kansas strip mined land (George Nettels, 750 acres; A. J. Cripe, 750 acres; G. A. Mullens, 660 acres; et.al.).[11]

These early conversions of strip mined land to pasture were most commonly accomplished by one of two methods; seedings with a mixture of sweet clover, Korean and Sericea lespedeze, using a power seeder attached to the rear of a bulldozer while leveling the crest of the ridges; or by sowing the sweet clover and lespedeze mixture from a seeder on a helicopter as practiced by the Sinclair Coal Company.[12] In some instances various grasses were added to the seeding mixture for experimental purposes. The seeding was generally done as soon as the stripping operations were completed.[13] Partial leveling of dumps before revegetation did not take place on significant acreages until the early 1950's. With the advent of more powerful bulldozers, several coal companies began "leveling" stripped areas and seeding grasses and legumes for livestock grazing. Still there was very little reclamation accomplished by individual land owners of the area. As far as I am able to determine, Maurice Barnes, of McCune, in Craw-

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[11]Wells, Reclamation, pp. 287-288.

[12]Ibid., p. 291.

[13]Foresman, Rehabilitation, pp. 104, 105.

ford County had carried on the largest single operation by a private landowner. In a ten year period beginning in 1958, he reclaimed 215 acres of dumps on land that was strip mined in the middle 1940's. The cost of leveling and seeding operations amounted to about $140 per acre.[14] Barnes' experience provided a good demonstration of the feasibility and profitability of strip mine reclamation.

Pre-1967 Concern

Surely there must have been early public concern for returning the strip mine dumps to beneficial use, but, I am able to obtain very little information to support this assumption. There were a few individuals, agencies, and some coal companies that made efforts or were concerned about treating the dump areas. Some examples follow:

In the Pittsburg Headlight-Sun, June 24, 1969, an article quoted Ted R. Taylor as saying:

> Back in 1933, I proposed legislation of a 25 cents per ton severance tax for reclamation. . . it was defeated . . . a lot of the mess we're in is due to legal minds and lobbyists employed by the mining interests . . . look what happened to Arcadia, they dug within half a mile of the town and look at it now. . .
>
> As a teacher and school administrator for the past 48 years, the last 31 of those at Girard, Mr. Taylor reported that, when he retires July 1, 1970, he's going to 'start some hell-raising'.

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[14]Memo to F. DeWitt Abbott from Roy M. Davis, "Technical Guides--Strip Mine Reclamation", February 3, 1969.

About 1952, there was an attempt to pass legislation requiring reclamation of strip mined land but to no avail. Clarence Rupp, Director of Research for the Kansas Farm Bureau said:

> We didn't have a chance at that time because every representative from the strip-pit area opposed our bill. We had people in for hearings, but these people simply could not get a sponsor in the area.[15]

Other early concerns take the form of agency reports and scientific papers. In 1949, Fred Eshbaugh, of the Soil Conservation Service, concluded a paper by pointing out the need for a well-formed operative program of research with the costs divided between the mining interests and state and federal governments to determine the best uses of stripped coal lands. He contended that an active program of reclamation in Kansas would be a good investment and that such a program deserved the hearty concurrence of all persons concerned with the State's welfare and economy.[16]

Prior to 1967, private owners of mined land had failed to redevelop their land to beneficial use for one or more of the following reasons:

1. Lack of knowledge as to profitability.

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[15]Letter to C. F. Bredahl from Clarence Rupp, December 13, 1967.

[16]Fred P. Eshbaugh, "The Place of Research in Relation to Certain Phases of Stripland Reclamation in Kansas". Transactions Kansas Academy of Science, Vol. 52, No. 2, 1949, p. 158.

2. Lack of financial resources to undertake reclamation work and reluctance to mortgage cropland to finance reclamation work.

3. Low cost of holding land in an unproductive state (in terms of county property taxes).

Prior to 1967, there was a general lack of any organized or group effort and concern but beginning in late 1967, several developments took place and a general public concern for the strip mine areas began to evolve. A Strip Pit Committee consisting principally of conservation district supervisors was organized with John Spurling, Crawford County District Supervisor serving as chairman. In September of 1967, the State Soil Conservation Committee named an ad hoc committee to advise local interests with regard to suggested legislation for control of strip mining. The See-Kan Resource Conservation and Development Project, a multicounty organization sponsored by local citizens, came into existence in 1968. One of their principal goals was treatment of strip mined areas. Governor Robert Docking appointed the Mineral Resources Task Group whose purpose is to encourage all practical and legitimate means of restoring strip mined land to beneficial use.

Thus the stage was set for action.

CHAPTER V

LEGISLATION AND STATE AGENCY ROLE

The Mined-Land Act

Pressure to apply more than simply piecemeal efforts to treat the strip mined areas of Southeastern Kansas really started to build in mid-1967. To solve the problem, the logical place to start seemed to be at the source of the problem, that is, prevent the growth of the problem. In an effort to hit at the source of the problem, the State Soil Conservation Committee[1] appointed an ad hoc group to assist local citizens in the development of legislation that would require interests to reclaim areas they stripped in the future. The committee named consisted of: Myrl Rennie, Raymond Schemm, and John Spurling, all of whom were conservation district supervisors; Roy Freeland, Secretary of the State Board of Agriculture; Keith Krause of the State Water Resources Board; and Morrie Bolline, State Conservationist of the Soil Conservation Service. C. F. Bredahl, Executive Secretary of the State Committee, served as Chairman of this special legislation group.

A bill had previously been prepared for the House Mines and Min-

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[1] In Kansas, the State Soil Conservation Committee membership consists of five conservation district supervisors, the Directors of the Agriculture Experiment Station and the Extension Service, and the Secretary of the State Board of Agriculture. The State Conservationists of the Soil Conservation Service serves in an advisory capacity.

ing Committee, but never introduced. Copies of this bill served as a guide for preparations and recommendations for a new bill.[2] With this head start the special committee was able to complete its work in short order and on November 29, 1967, Bredahl transmitted draft copies of the proposed bill to committee members and to John Spurling for his use with local interests and state legislators.[3] Wide public support was indicated for the proposed legislation through the actions taken by two state-wide organizations. At their annual convention the Kansas Farm Bureau Organization passed a resolution favoring legislation that would require returning strip mined land to productive agricultural use comparable to its use prior to mining operations.[4] The Kansas Association of Conservation Districts passed a similar resolution at its annual meeting.[5] The bill, known as the Kansas Mined-Land Conservation and Reclamation Act was passed during the 1968 legislative session with an effective date of January 1, 1969.

The Act states that "where surface mining operations are con-

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[2]Memo to the Special Legislation Committee from C. F. Bredahl, September 15, 1967.

[3]Letter to the Special Legislation Committee Members from C. F. Bredahl, November 29, 1967.

[4]Letter to C. F. Bredahl from Clarence Rupp, December 13, 1967.

[5]Kansas Association of Conservation Districts, Proceedings of Twenty-Third Annual Meeting, (Wichita, Kansas, December 3, 4 and 5, 1967), p. 63.

ducted, it is declared the policy of this State to provide for the reclamation of affected lands to encourage productive use. . . "[6]

Creation of the Mined-Land Board

The Act created an eleven man mined-land conservation and reclamation board chaired by the state labor commissioner. Other board members to be appointed by the governor, are one representative each of the State Geological Survey, the Economic Development Commission, the State Soil Conservation Commission, the State Board of Agriculture, the Forestry, Fish and Game Commission, the employees of mine operators, the State Water Resources Board, one operator of surface type mines and two land owners who are cooperators of a local soil conservation district.

Major Requirements of the Act

After January 1, 1969, any person engaged in surface mining must obtain a permit from the board. Applications for permits must be accompained by a plan of reclamation that meets the requirements of the Act and the rules and regulations developed by the Board. To insure that reclamation is carried out following mining, an operator is required to post bond of $200 to $500 per acre with a minimum bond on any permit of $200.

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[6]Kansas Mined-Land Conservation and Reclamation Act, S.S.A., Session of 1968.

The Act itself and the rules of practice and procedure of the Mined-Land Board give details of how the reclamation of the area will be accomplished. Briefly, these rules[7] require that in so far as practical, the reclamation work will be carried out concurrently with the mining operations. The rules specify the slope allowances, the requirement of a revegation plan, and the conditions necessary for the Board's approval of plans relative to water impoundments. A provision to require that top soil be returned to the surface of reclaimed land has been approved by the Mined-Land Board.[8] Returning the topsoil to the surface, while increasing the cost of reclamation, will greatly improve the chances of obtaining a good vegetative cover. The proposed provision will become effective January 1, 1975. So the necessary tools exist for the assurance that areas strip mined in Kansas after January 1, 1969, will be restored to beneficial use.

But what about the estimated 43,300 acres of strip mine dumps needing reclamation that existed before 1969? What was to become of these "orphan" spoil banks as they were soon to become known? The Act did not provide for the restoration of these areas.

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[7]Rules of Practice and Procedures of the Mined-Land Conservation and Reclamation Board of Kansas., Kansas Statute Annotated 1969, Supp. 49-405.

[8]Personal conservation with C. F. Bredahl, July 15, 1973.

CHAPTER VI

THE PROBLEM OF THE "ORPHAN" SPOILBANKS

Creation of the Mineral Resources Task Group

Concerned citizens of Southeastern Kansas acted to insure that land disturbed by mining would be restored; and they secured passage of the Kansas Mined Land Conservation and Reclamation Act in 1968. However, this legislation provides only for reclamation of land strip mined for coal after January 1, 1969, and contains no provision for reclamation of approximately 43,300 acres of "orphan spoilbanks" in Southeastern Kansas which were stripped prior to that date.

An Action Task Group, composed of interested local citizens, was appointed by Governor Robert B. Docking in July, 1969, to find solutions to mined-land problems not covered by legislation.[1] The Task Group--consisting of one banker, three farmers, one coal mining executive, one producer of crushed limestone, and an agriculture experiment station director--has attempted to bring land, money, and management resources together inorder to achieve redevelopment. Specifically, this Task Group was to: (1) determine the land ownership and availability for redevelopment of mined land, (2) determine and

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[1]Kathleen Q. Camin and Ronald G. Hardy, Final Report, Mined-Land Redevelopment: Southeast Kansas Portion of the Ozarks Region. The Ozarks Regional Commission, 1971-1972, p. 3.

demonstrate productive land uses, and (3) determine and explore sources of funds for redevelopment projects. The Task Group has been assisted by a technical staff from the Mined-Land Redevelopment Office of the Kansas Geological Survey established at Girard, Kansas. The Ozarks Regional Commission[2] agreed to fund the technical assistance staff through the State Geological Survey. Dr. Kathleen Q. Camin, Associate Professor of Economics at Wichita State University, was selected as the Project Coordinator. Out of this Task Group came the Extension Service Demonstration projects. The details of this and other projects accomplished by the Group will be discussed in detail in Chapter VIII.

The See-Kan Resource Conservation and Development Project Committment

The Southeastern Kansas Resource Conservation and Development Project (See-Kan RC&D) area was organized for the development and conservation of natural and human resources in February of 1969. Legal sponsors are county commissions and soil conservation districts from the counties of Allen, Bourbon, Cherokee, Crawford, Labette, Montgomery, Neosho, Wilson and Woodson. Members of the board

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[2]The Ozarks Regional Commission is a Federal-State partnership formed to develop long range economic development plans for regions in Missouri, Arkansas, Oklahoma, and the nine southeast counties of Kansas. The governors of the four states and a federal co-chairman, appointed by the President, are the members of the commission.

of trustees consist of one county commissioner, one conservation district supervisor, and one member at large from each of the nine counties. The Board of Trustees submitted an application to the United States Department of Agriculture in July 1969, requesting that a Resource Conservation and Development Project be authorized in these nine counties, and in February of 1971, the See-Kan RC&D Project was authorized for planning by the Secretary of Agriculture. The Soil Conservation Service of the U.S. Department of Agriculture assigned Luther J. Gaskell, the District Conservationist at Altamont, Kansas, to serve as the project coordinator.

The broad objectives developed by the See-Kan RC&D Board of Trustees include the development of a plan of work for the nine counties that would conserve, develop, and utilize the resources and improve the general economic conditions of the area. The principal effort is to help secure the required technical, financial, educational and other services required to develop and apply a project plan.[3] All projects such as restoring mined land to productive uses orginate with a local sponsor. The Governor's Mineral Resource Task Group submitted two RC&D proposals to establish demonstration projects to redevelop mined lands in Crawford and Cherokee Counties.[4] Responding favorably, the

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[3]See-Kan RC&D Project Inc., Report of the Board, Mined-Land Redevelopment, 1971, p. 4.

[4]Ibid.

See-Kan RC&D Board agreed to assist in seeking funds and technical assistance for additional demonstration that mined land could be re-developed. A detailed account of the results of this effort is found in Chapter VIII. Thus, for the first time in its long history, the early strip mined area, or "orphan spoils" of Southeastern Kansas were to receive organized attention and efforts aimed at restoration.

CHAPTER VII

CONTRIBUTIONS OF STATE AND FEDERAL AGENCIES

With a problem as complex as strip mine reclamation, no one agency or group has all the answers. The story of mined-land redevelopment in Southeastern Kansas is also the story of a cooperative and unified effort. Many agencies and individuals have provided input to the accomplishments. It is our purpose in this chapter to take a look at the specific contributions of those involved.

State Conservation Commission

This body was particularly helpful in getting the needed legislation to provide for reclamation of lands stripped after January 1, 1969. The Executive Secretary serves on the Mined-Land Board and works very closely with the Mineral Resources Task Group. He believes that the Mined-Land Law has been and is continuing to be successful in restoring the land to beneficial use.[1]

Ozarks Regional Commission

The interest of the Ozarks Regional Commission in supplying needed research funds for the various demonstrations since 1969, has made the project a reality. Through October 15, 1972, the Commis-

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[1]Personal letter, C. F. Bredahl, December 27, 1973.

sion had made a total investment in the area of $206,000.[2]

Mineral Resources Task Group

The Mineral Resources Task Group appointed by the Governor has perhpas been the most important catalyst in recent progress on strip mine reclamation projects. Their creation and objectives have already been covered in Chapter VI and their many accomplishments are recorded in Chapter VIII. It sufficies here, I think to simply quote John Sheltar, SCS District Conservationist at Girard for the past twenty-seven years, who says, "You might say that nothing happened on redeveloping old strip mined land until Dr. Kay Camin and group (Mineral Resources Task Group) arrived on the scene."[3] The true coordinating effort in most of the work accomplished since its creation in July, 1969, has been the Mineral Resources Task Group.

Kansas Geological Survey

The Kansas Geological Survey had recognized the strip mine reclamation problem a number of years ago as indicated by a land reclamation article appearing in the September-October, 1960, issue of the Mining Congress Journal.[4] However, they shifted from a passive to

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[2]Camin, Hardy, Mined-Land Redevelopment, 1971-1972, p. 26.

[3]Personal letter, John A. Sheltar, October 12, 1973.

[4]Walter H. Schoewe, "Land Reclamation", Mining Congress Journal, September-October, 1960.

an active role with the passage of the Mined-Land Law in 1968, which stated that one Survey staff member would serve as a member of the Mined-Land Board. Furthermore the Survey was selected by the Mineral Resources Task Group to direct and handle any monies available for reclaiming orphan spoils. Their job was to administer the Task Group operation, handle finances and bookkeeping chores, and provide technical support. They eventually received about $200,000 in grants from the Ozarks Regional Commission for the treatment of orphan spoils, but all efforts made by the Survey were contributed services for which the Survey received no reimbursement. For example, during the first year of the orphan spoil project the Survey received a grant of about $30,000; the Survey contribution in services amounted to about $15,000.[5] They are presently conducting research on the use of fly ash to alter the pH of acid spoil-bank soils.

Conservation Districts

The Soil Conservation Districts (SCD) supervisors led by John Spurling, Chairman of the Crawford County District, took an active role in all phases of reclamation work. This group conducted numerous tours and meetings for those concerned with strip mining and instigated work that resulted in the Mined-Land Law of 1968. They accepted applications from landowners for cost-share assistance in

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[5]Personal letter, Ronald G. Hardy, September 26, 1973.

sloping mined lands under the Thousand-Acre Demonstration Program and generally served as the intermediary between the land owners and the RC&D Board who administered the funds. They gave priority to strip mine reclamation in their plans of work and cooperated further by relinquishing SCS technical assistance to the various projects.

See-Kan Resource Conservation and Development Project, Inc.

The See-Kan RC&D Board served as the vehicle for seeking funds and developing the Thousand-Acre Demonstration Project. They solicited and administered Ozark Regional Commission funds for the sloping of mined lands in Bourbon, Crawford, Cherokee and Labette Counties. Subsequently they were successful in helping secure funds from the Rural Environmental Assistance Program, administered by the Agriculture Stabilization and Conservation Service, for seeding the sloped lands. They maintained detailed records of cost share paid, amount of land redeveloped and other information on the Thousand-Acre Project. These records are available at the See-Kan RC&D Project Office at Chanute, Kansas.[6] They gave priority to reclaiming strip mined land in their annual work plans and solicited help from other agencies.

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[6]See-Kan RC&D Project, Inc., Report of the Board, Mined-Land Redevelopment, 1971, 1972, p. 33.

Kansas State University Cooperative Extension Service and Agricultural Experiment Station

The Extention Service, Kansas State University and Kansas Agri-cultural Experiment Station have supported mined land reclamation both in interest (conducting meetings, carrying out an informational and educational program, participating in tours, and planning sessions) and in research-demonstration projects. They received a $16,000 grant from the Ozarks Regional Commission to pay approximately one-half the cost of treating four 40 acre plots.[7] They prepared the research plan upon which the grant was based and have administered the funds. They have more than matched the $16,000 grant in manpower, travel, laboratory analysis, and supplies.[8] They will continue to accumulate records on costs and returns on the reclaimed land.[9]

Kansas Forestry Fish and Game Commission

The Commission has been involved in varying degrees in game and fish management on strip mined lands for a considerable length of

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[7]Kathleen Q. Camin, Ronald G. Hardy, and William W. Hambleton, Mined-Land Redevelopment: Southeast Kansas Portion of the Ozarks Region, Report of Mineral Resources Task Group, October 15, 1971, p. 8.

[8]Robert A. Bohannon, and Frank G. Bieberly, Mined-Land Research, Southeast Kansas Demonstration Program, May 1972, p. 23.

[9]Frank G. Bieberly, personal letter, October 11, 1973.

time. They have carried out various fish and game management practices on some 6,6064 acres of state owned land in Crawford and Cherokee Counties.[10] The bulk of the acreage is composed of strip mined land.

Agricultural Stablization and Conservation Service

The agency is responsible for administering the Rural Environmental Assistance Program, a program designed to provide financial assistance to farmers and ranchers applying conservation systems to their land. When petitioned by the See-Kan RC&D Board, County ASCS Committees, and the Mineral Resources Task Group, the State ASC Committee responded by allocating $20,000 of cost-share funds to establish vegetation on 1,000 acres of strip mined land.[11] About 1,000 acres of mined land was seeded with cost-sharing from ASCS using the regular pasture planting practice (A-2) prior to approval of the special 1,000 acre demonstration project.[12] Lester Branson, Agricultural Program Specialist for ASCS as well as the county executive directors of ASCS participated in many tours, meetings and conferences directed at treating the strip mined lands.

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[10]Richard O. Hager, "Management Plan of the Strip-Pits Game Management Area"., 1972, p. 108.

[11]Letter to Paul Hunter, President, See-Kan RC&D Board from Frank Mosier, ASCS State Executive Director, March 19, 1971.

[12]Lester Branson, Personal letter, June 14, 1973.

Farmers Home Administration

The principal contribution of the Farmers Home Administration has been the part county and district personnel have played in helping with tours, meetings, etc. The agency stands ready to provide funds in the form of loans to individual landowners for reclaiming strip mined land. As far as I have been able to determine no loans for this purpose have been made to date.

Forest Service

The Forest Service developed a program for rehabilitation of lands stripped for coal in Southeastern Kansas in the Spring of 1933.[13] Numerous tree plantings were made on spoil areas through the years using technical assistance from the Service as well as from State and Extension Forestry. They have continuously evaluated tree plantings on spoil areas and made the information available for public use through various publications.

Soil Conservation Service

Soil Conservation Service (SCS) involvement dates back to the early 1940's. Eshbaugh supervised an orchard and vineyard planting west of Pittsburg in 1940 and 1941. The National Youth Administra-

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[13]Nelson F. Rogers, "The Growth and Development of Black Walnut on Coal Strip-Mined Land in Southeast Kansas", Trans. Kansas Academy of Science, Vol. 52, No. 1, 1949.

tion enrollees made the plantings.[14] Reference was previously made to a 1949 SCS publication by Fred Eshbaugh pointing out the need for research on reclaiming strip mined lands.[15]

A review of reports and correspondence indicates that SCS has continually evaluated plant materials planting made on spoil banks since 1943. District Conservationists have urged vegetative plantings and have arranged for seed and other plant materials to be provided to landowners from the SCS Plant Materials Center at Manhattan, Kansas. They regularly gather information on the status of land distrubed by surface mining.

As accelerated field work got underway Dale Younkin, the Area Conservationist, committed staff personnel in the counties to provide technical assistance in the form of layout, supervision of construction, and certification of land sloping under the Thousand-Acre Demonstration Project.[16] The contributive technical services of SCS field office personnel on this project amounted to over 1,600 man hours.[17]

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[14]John A. Shetlar, Personal letter, October 12, 1973.

[15]Fred P. Eshbaugh, "The Place of Research in Relation to Certain Phases of Stripland Reclamation in Kansas", Trans. Kansas Academy of Science, Vol. 52, No. 2, 1949, pp. 149-159.

[16]Memo to District Conservationists from Dale Younkin, "Mined Land Redevelopment--1,000 Acres Demonstration Project", RC&D and ASCS, June 17, 1971.

[17]See-Kan RC&D Board, Report of the Board, Land and Water Redevelopment on Mined Land, 1971-1972, p. 32.

Prior to this time, F. D. Abbott, State Resource Conservationist with SCS, chaired an interagency committee that developed a technical guide to assist those who prepare or review reclamation plans. Dick Holland, Geologist with SCS, completed a study of the strip pit sediment production in 1973. Reference to Holland's study was made in Chapter III. State Conservationists have continually supported the work by both personal involvement and by making technical time and plant materials available.

Other

There are other groups and individuals who have played important roles in the progress to date. Delno Bass, former Commissioner of Labor for Kansas, stimulated the initiation of the Mineral Resources Task Group and their various projects. The Tennessee Valley Authority contributed a portion of the fertilizer for the Extension Demonstration Projects. Research Assistants have included students from Kansas State College at Pittsburg and Wichita State University. The U.S. Bureau of Mines provided for a special student researcher in fly-ash effects as a soil amendment.[18] Contractors of the area have helped to sponsor numerous workshops and tours. Various community and civic organizations have also assisted. The news nedia has provided assistance from the very beginning of the program. The See-Kan RC&D

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[18]Camin, Hardy, Mined-Land Redevelopment, p. 6.

"scrapbook" contains over 70 acticles published by newspapers and farm magazines serving the area. Several radio and television programs have also featured the projects. Finally, much credit must go to the landowners involved who spent a considerable amount of their own time and money to make the demonstration projects possible.

CHAPTER VIII

RECLAMATION EFFORTS AND ACHIEVEMENTS

In Chapter IV, the pre-1967 efforts to treat strip-mined areas were discussed in detail. This Chapter will concentrate upon the efforts and accomplishments that took place after a much deeper concern evolved.

Accomplishments of the Mineral Resources Task Group

The objective of the Mineral Resources Task Group is to stimulate, advise, and in some cases direct the redevelopment of mined land in Southeastern Kansas. Initial focus was upon the 45,000 acres which were strip mined for coal prior to January 1, 1969. The plan was to bring maximum acreage back into productive use on a parcel-by-parcel basis as the acreage, funds, and management can be brought together. In order to encourage the redevelopment of the 45,000 acres, the Mineral Resources Task Group was organized in July, 1969. This group is an "action" group organized to encourage all practical and legimate means of restoring strip mined land to productive use. It is composed of individuals from various professions with interest in reclamation. The members were appointed by the Governor and receive neither pay nor expenses. The Task Group is supported by a paid technical assistance staff. The Mineral Resources of the Kansas Geologi-

cal Survey has the responsibility for this technical assistance staff and has received funds from the Ozarks Regional Commission to provide staff and additional necessary non-personal expenses. The Task Group maintains close cooperation with the Kansas Mined-Land Reclamation and Conservation Board since this Board sets the standards for reclamation on all land surface mined after January 1, 1969.

The Task Group maintains an office run by members of the technical staff. The office is known as the Mined-Land Redevelopment Office and is located in the Crawford County Courthouse, Girard, Kansas. The members of the Mineral Resources Task Group appointed by the Governor of Kansas were:[1] R. W. Fowler, Chairman, Banker, Citizens State Bank of Weir; Maurice Barnes, Cattleman and Rancher of McCune; Dr. Fred W. Boren, Superintendent in Charge of SEK Branck Experiment Station at Mound Valley; Delno Bass, Coordinator, Governor's Committee on Manpower Planning, Topeka; Ronald G. Hardy, Executive Project Director, Chief of Mineral Resources Section of the State Geological Survey, Lawrence; John W. Mackie, Jr. Secre-

[1]On December 21, 1972, Governor Docking dissolved the Mineral Resources Task Group in favor of a six-member Mined-Land Task Group to serve as the official agency to receive funds for financing Mined-Land Programs. The Mineral Resources Task Group had accomplished the purposes for which it was established. Appointed to the new group to receive and administer available federal funds were: Darrell D. Carlton, Kansas Labor Commissioner; Delno L. Bass, State Manpower Coordinator; Maurice Barnes, McCune rancher, Chairman; R.W. Fowler, Weir, Kansas Forestry Fish and Game Commission Member; John Mackie, Jr. Pittsburg, Mine Operator; and Frank G. Bieberly, Manhatten, with the Kansas State University Extension Service.

tary-Treasurer, Clemens Coal Company, Pittsburg; George E. Nettels, Jr., President, Midwest Minerals, Inc., Girard; Meade Gibbs, Farmer and Stockman, Pittsburg; and Darrell Carlton, Commissioner of Labor, Topeka. Dr. Kathleen Q. Camin, Associate Professor of Economics, Wichita State University, is the Project Director.

During the first year the Task Group was concerned mainly with development of data regarding location and ownership of mined land in Cherokee, Crawford, Bourbon and Labette Counties The group relied on aerial photographs, land-ownership maps, and property tax records to determine location and ownership of land strip mined for coal prior to 1969.[2] The fruits of their labor are recorded in Appendix A. It also determined the ownership and other characteristics of strip mined land. This information is discussed in Chapter III. Before the Task Group was formed only 600 acres had been reclaimed and almost all of this was done by Maurice Barnes of McCune, Kansas. During the Group's first year, 800 acres were added to this total.. The major portion was done by Barnes and the Clemens Coal Company.

Fortunately, the work of Maurice Barnes was an excellent demonstration of the potential feasibility to reclaim land for beef production by the private owner in Southeastern Kansas areas distrubed by surface mining. The process consisted essentially of sloping the land to a roll-

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[2]Camin, Hardy, Mined-Land Redevelopment, p. 4.

ing terrain, and establishing vegetation for livestock grazing. The Task Group concluded that the experience of this single innovator (Maurice Barnes) in reclaiming mined land, although impressive, should be supplemented by other activity. Evidence for the feasibility and profitability of reclamation could be developed only through additional research and demonstration.[3]

Because few landowners engaged in mined-land restoration in the past, the Task Group decided to explore landowner attitudes toward reclamation. Such information would be helpful in devising a strategy for encouraging landowners to undertake reclamation. By April, 1971, 60 persons were interviewed who owned 4,300 acres of mined land in Cherokee and Crawford Counties, or almost 20 percent of the mined land onwed by individuals in these two counties. The results of these interviews are summarized in Table 5. Most persons interviewed believed that reclamation is needed, but refrained from engaging in reclamation for financial reasons, lack of interest, or belief that reclamation is impossible. Clearly, some financial assistance or incentive was necessary to stimulate most landowners to reclaim mined land. The survey was discontinued in early April because of probable bias in responses caused by news of the introduction of demonstration programs.

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[3] Ibid., p. 7.

TABLE 5

Summary of Personal Interviews Regarding Landowner Attitudes Toward Reclamation.*

Reasons for not Reclaiming	Percent of Individuals Owning Mined Land	Percent of Total Mined Land Owned By Such Individuals
Financial: high cost of reclamation----------	67	72
No interest in reclamation, no opinion concerning reclamation, or no comment---	14	10
Owner's belief that his mined land was of such low quality that reclamation was not possible; owner too elderly; landowner and tenant not the same individual----------	16	15
Reclamation under consideration----------	3	3
Total----------	100	100

*Source - Mineral Resources Task Group.

Research and Demonstration Programs:

Extension Demonstration Program

The first program undertaken, although referred to as the Extension Demonstration Program, was research oriented; replicated research plots were established at each site, and use of the reclaimed mined land was carefully controlled. Specifically, the objectives of the Extension Demonstration Program were (1) to demonstrate the economic feasibility of redeveloping the mined land into grassland; (2) through research, to develop technical information regarding better methods of reclaiming mined land to grassland, especially with respect to land leveling and management, seedbed preparation, fertilizer, and soil amendment, adaptability of various grass species, time and method of seeding, and value of cover crops; (3) to acquire accurate data on costs and returns; (4) to promote the redevelopment of strip mined land in the four-state Ozarks area; and (5) to provide four demonstration sites where residents of Southeastern Kansas could follow the process of reclamation from start to finish.

The Task Group requested the assistance of the Kansas Cooperative Extension Service (CES), an agency of the U.S. Department of Agriculture and Kansas State University, to assist with the establishment of the program because of a successful history of organizing and managing test-demonstration plots on a cooperative basis with landowners. Subsequently, the Task Group organized an Agricultural

Advisory Committee, which devised the general research-demonstration design and the leveling specifications, established cooperator--selection guidelines, and selected cooperators. Also with the assistance of the Kansas CES, a grant application was prepared and submitted to the Ozarks Regional Commission. The Ozarks Regional Commission awarded a $16,000 grant to the Kansas CES that permitted establishment of the four proposed research plots for demonstration of the economic feasibility of reclaiming mined land for pasture. Each plot consists of 40 acres; two plots are in Crawford County and two are in Cherokee County. The grant provided half of the cost of leveling and seeding; cooperating landowners paid the remaining cost.[4] The four farmer cooperators selected to participate in the research-demonstration program were: H. A. (Bud) Kuplen, Mulberry; Joe and John Mussa, Cherokee; Earl McColm, McCune; and Leon Epler, Hallowell. A payment of $74.20 per acre was made to each cooperating farmer for land shaping, seedbed preparation, and fencing the research-demonstration site. The payment was made by the Kansas CES with funds received from the Ozarks Regional Commission.[5]

Land Shaping

Land shaping contractors were employed by the cooperating farm-

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[4]Ibid., p. 7, 8.

[5]Bohannon, Bieberly, Mined Land Research, p. 5.

ers on the basis of bids. The contractors were required to level and shape the mined-land in accordance with the following specifications developed by the cooperating agencies, which included the Kansas Geological Survey, Mineral Resources Task Group, Tennessee Valley Authority, Soil Conservation Service, and Agricultural Stabilization and Conservation Service. Slopes not to exceed 10 percent were to be attained on 90 percent of the land and slopes could not exceed 15 percent on the remainder of the land.[6] Cost of shaping the mined-land sites ranged from $120 to $140 per acre. The shaping included one heavy I-beam dragging and one Rhome disking. Land shaping was started in February, 1971. Shaping on the Kuplen, McColm, and Mussa sites was completed in February and March. Shaping on the Epler site was completed in June.[7] Soil tests were made before and after sloping and the recommended rates of fertilizer and lime were applied. The demonstration areas were seeded to K-31 fescue. The grass was seeded with 1 to 1 1/2 bushels per acre.[8] One acre was set aside at each site for the purpose of conducting research to determine needed soil management practices and to evaluate various plant species as vegatation for reclaiming mined-land. Detailed records on the Extension

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[6]Program specifications for the Extension Demonstration Program are shown in Appendix B.

[7]Bohannon and Bieberly, Mined Land Research, p. 5.

[8]Ibid., p. 18.

Demonstration Project are being compiled. These records are available at the Extension Service Office, Kansas State University at Manhattan, Kansas.

It should be noted that this project further exemplifies the organized joint effort to help demonstrate the possibility of restoring strip mined areas to beneficial use. The Task Group and technical staff of the Kansas Geological Survey Mined-Land Redevelopment Office provided on-site consultation during the leveling process and assisted the Soil Conservation Service in producing topographic maps which were used for measurement of slopes and acreage. The technical staff also collected samples, and tested the soils at the CES Laboratory. The County Extension Agent recommended lime and fertilizer application rates to the cooperators. The Ozarks Regional Commission provided funds to cost-share the sloping. The Agricultural Stabilization and Conservation Service cost-shared the lime applications. Sharp Brothers Seed Company provided a portion of the seed and The Tennessee Valley Authority provided part of the fertilizer cost.

Demonstration Program: Thousand Acre Project

All Resource Conservation and Development projects such as the thousand-acre demonstration project to redevelop mined lands into productive uses, come from a local sponsor of a RC&D measure. The Governor's Mineral Resource Task Group submitted RC&D measure

proposals to establish demonstration projects in Cherokee and Crawford Counties.

The See-Kan RC&D Board of Trustees first attempted to secure cost share funds for one demonstration project in Crawford County from the Agricultural Stabilization and Conservation Service (ASCS), United States Department of Agriculture. ASCS officials in Washington, D. C., ruled that Rural Environmental Assistance Program (REAP) funds could not be used to cost share in shaping or smoothing mined land areas. They did indicate, however, that REAP cost share funds could be used for establishing vegetative cover on graded or shaped mined land areas.[9]

The See-Kan RC&D Board of Trustees then filed a joint application to the Ozarks Regional Commission (ORC) and the ASCS for funds to shape and seed 1,000 acres of mined land in Cherokee and Crawford Counties. The application was co-sponsored by the Agricultural Stabilization and Conservation Committees, the Soil Conservation Districts, and the SCS District Conservationists, from Cherokee and Crawford Counties.

The application was approved resulting in a contract being signed by See-Kan RC&D, Inc. and ORC for $65,500 for shaping, smoothing and identification of redevelopment sites. The ASCS set aside $20,000

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[9]Letter to Chairman, Kansas State ASCS Committee from George V. Hansen, August 20, 1970.

of special REAP funds for liming, fertilizing, and seeding of graded areas. The first funds ($30,000) for redevelopment work were received from ORC on July 24, 1971, only two and one-half weeks after the contract was signed.[10]

By mutual agreement of the sponsors and ORC, the demonstration project was expanded to include areas in Bourbon and Labette Counties. Each of the counties received an allotment of acres for redevelopment based upon the total acres of mined land within their county. This demonstration has had a tremendous impact on the area. Whether the redevelopment of mined lands proves feasible or not, this project has created a new desire in the poeple of the area to do something about the mined land "dump areas". This new pride has resulted in the beautification, stabilization, and redevelopment of well over 1,000 acres of these formerly desolate, ugly scars.

Methodology

A great deal of planning and work went into developing a method to carry out and evaluate this demonstration project. Assisting the RC&D Board in the development of the project were: The Soil Conservation Districts, Soil Conservation Service, Agricultural Stabilization and Conservation Service, Mined-Land Task Force, Mined-Land Re-

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[10]See-Kan RC&D Board of Trustees, Report of the Board, Land and Water Redevelopment on Mined-Land, 1971, 1972, p. 5.

development Board, Kansas Geological Survey, Cooperative Extension Service, Farmers Home Administration, County RC&D Committees, County Agricultural Stabilization and Conservation Committees and others. This group agreed upon specifications to be followed in shaping, soil test, and soil treatment. These specificiations and guide lines were covered in two handouts prepared by the See-Kan RC&D Board. (See Appendix C) These two handouts were given wide distribution to owners of mined lands, and the program received much publicity in the local news media. Starting July 1, 1971, Soil Conservation Districts (SCD) in the four eligible counties began receiving applications for cost share assistance.

Board members of SCD's accompanied by the Soil Conservation Service (SCS) representative toured the site of each applicant. SCD Boards then approved the applications that they deemed most valuable in demonstrating the feasibility of redeveloping mined lands. Approvals were limited for cost sharing to tracts of not less than five acres or larger than twenty acres. The SCD Board notified the See-Kan RC&D of the approval; who in turn reserved the number of dollars requested on the application. The amount could not exceed $1,250 for any one landowner.[11]

The Soil Conservation Service was responsible for staking the area to be shaped, working with the contractor during construction on

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[11] Ibid., p. 9.

any problems encountered regarding slopes or drainage and certification to the SCD when the work was completed. The Mined Land Redevlopment staff (MLR) and SCD's provided considerable manpower in this effort. Following certification by SCS, the SCD would request cost share payment from the See-Kan RC&D Board, who would in turn make payment to the landowner. At the time the earth moving was completed, the landowner could request cost share assistance from the ASCS if assistance was desired or needed to establish vegetative cover. Also, following completion of shaping, the MLR would obtain soil samples from each 200 foot square area (approximately one per acre). MLR would run individual soil analysis for soil pH to determine the calcium requirements. The Extension Service would evaluate the soil analysis and recommend soil amendments needed to establish vegetation. To obtain cost share assistance, the landowner agreed to furnish for a three period, all cost-return data on the mined land redevelopment plots. The SCD, SCS, MLR, and CES assisted the See-Kan RC&D Board in collecting, recording, and evaluating the cost-return information.

Work was completed on sixty-two of the approved demonstration plots. Nine hundred eighty-nine (989) acres were cost-shared and the landowners sloped another 122 acres without cost-share. The cost for sloping and grading on the first 850 acres averaged $162 per acre.

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[12] Ibid., p. 16.

Each landowner received a maximum of $62.50 cost-share per acre or about 38% of the cost.[12] The cost of fertilizer, lime, seedbed preparation, seed and seeding drawn from a random sample averaged $38.18 per acre.[13] The See-Kan RC&D Board has maintained detailed records of each demonstration plot. These records are available at the Chanute, Kansas RC&D Project Office and at the Mined Land Redevelopment Office at Girard. An interesting point in review of these records is the fact that some 116 acres, or about 10% of the graded land, was treated with the intention of using it for recreation or housing developments. The remainder was treated to porvide farmland or forage for increasing livestock production. Cost-sharing specifications for the Thousand-Acre Project are shown in Appendix C. Table 6 shows the acres reclaimed under the Extension and Thousand-Acre Projects. Cooperators who participated in the cost-share program reclaimed an additional 150 acres without cost-share.

The 1973 Grassland Demonstration Project

Twenty-eight demonstration and research sites involving 510 acres were selected from applications received by the Mined-Land Task Group. The $40,000 in funds for cost-sharing at the rate of $60 per acre were granted by the Ozarks Regional Commission. Wichita State University administered the funds.

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[13] Ibid., p. 18.

TABLE 6

Acres Reclaimed with Ozarks Regional Commission
Cost-Share Funds, 1972.*

Counties	Number of Sites	Land Acres	Water Acres	Total Acres
Cherokee----------	24	528	87	615
Crawford----------	31	641	117	758
Bourbon----------	7	85	3	88
Labette----------	4	54	9	63
Total----------	66	1,308[1]	216	1,524

[1] 1,150 acres were cost-shared.
*Source - Mineral Resources Task Group.

Reclamation procedures were carried out much the same as those described under the Thousand-Acre Project. The sites will be used for both agronomic and economic demonstration and research. The sequence of a typical reclamation project is shown in Figures 7a, 8 and 9 on the following pages.

The 1974 Cropland Demonstration Project

In December 1973, the Mined-Land Task Group received an $18,000 grant from the Ozarks Regional Commission for use in demonstrating the feasibility of restoring strip mined land for cropland use. As of January 19, 1974, twelve cooperators, six in Crawford County and six in Cherokee County, had been selected by the Task Group. The grading of cropland must be flatter than that required for grassland, therefore the Task Group set the cost-share rate at $80 per acre. This work is now underway. Cooperators will be required to maintain records to aid in developing economic data on these sites.[14]

Use of Reclaimed Land: Redevelopment into Grassland

As stated earlier the trend in treating mined land is toward establishing pasture grasses for livestock forage production. Grassland for the cattle industry is a natural choice because it appears to be both profitable to the individual and beneficial to the region.

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[14] The Parsons Sun, News article, Parsons, Kansas, Jan. 19, 1974.

Figure 7a (The Pittsburg & Midway Coal Mining Co. Photo)
After mining operations have been completed, dozers begin the work of grading and shaping the mined land. From 8,000 to 10,000 cubic yards of material per acre must be relocated in the process. (Figure 7 is repeated here for continuity in the sequence of reclamation photos.)

Figure 8 (Pittsburg & Midway Coal Mining Co. Photo)
Shaped area which has been disked with a heavy-duty Rhome disk. This area will be further conditioned with a small disk and harrow in preparation for seeding.

Figure 9 (Pittsburg & Midway Coal Mining Co. Photo)
Area which has been seeded with a conventional seeding drill. The photo was taken three weeks after seeding was completed in the fall of 1971. Seeding consisted of wheat, alfalfa, and fescue.

At this time grassland for cattle grazing appears to be a wise use of reclaimed land for many reasons: (1) cattle production is the largest industry in Kansas as measured by dollar output. (2) Kansas ranks fourth in production of cattle and calves, and the Kansas portion of cattle production is increasing. One explanation is that Kansas is part of the Milo Belt, and cattle production in the Milo Belt is increasing while cattle production is decreasing in the Corn Belt. (3) The demand for beef is increasing because the per capita consumption of beef is increasing at the same time that population is growing. For these reasons the Extension Demonstration Project is geared entirely toward grass production and these reasons, no doubt, account for the fact that over 90 percent of the acres reclaimed have been established to grass for livestock grazing. The major portion of the remaining strip mined lands are also suitable for grassland development.

Plant Materials Trials

The Soil Conservation Service, in cooperation with the Pittsburg and Midway Coal Company and the Cherokee County Conservation District, has been conducting plant materials trials on mined land since about 1960. Over 50 species and varieties of grasses, legumes, shrubs and trees have been planted.

Leonard Jurgens, Range Conservationist with SCS, summarizes the results as follows:

> The most consistent establishment of grasses has been achieved with Blackwell, Caddo, and Kanlow switchgrass. Kanlow switchgrass also establishes and spreads readily on shorelines of strip pit lakes. One of the best plantings of grass is a mixture of Blackwell and Kanlow switchgrass, Cheyene indian grass, Kaw big bluestem and Aldous little bluestem. No fertilization is necessary for these grasses.
>
> Elkan bluestem, causasian bluestem, weeping lovegrass and bermuda grass are warm season introduced grasses that have been tried. With the exception of weeping lovegrass, these species have been readily established. These grasses need periodic fertilization.
>
> Two introduced cool season grasses, Kentucky 31, fescue and southland brome can be readily established. Kentucky 31 fescue is the more promising, but requires periodic fertilization.
>
> Of the eleven legume species which have been tried, Emerald crownvetch, Cicer milkvetch, and Illinois bundelflower show excellent growth and ability to spread. Emerald crownvetch is very aggressive and unless kept under control tends to crowd out other vegetation.
>
> Cardinal autumn olive has proven most successful of the six different shrub species planted. Plantings of arnot bristly locust also shows promise. European blackalder, honeysuckles, woodward winterberry and conifers have proven less successful.[15]

Most Kansas spoils will support tree growth. Some of the old areas, for example; the state lake and park just north of Pittsburg, show excellent tree growth. From the standpoint of aesthetic and wildlife values it would be a mistake to clearcut these old lands and put in

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[15]Leonard Jurgens, Suitable Plant Materials for Various Uses on Reclaimed Mined Land in Southeast Kansas, Proceedings, Mined Land Workshop, State Geological Survey of Kansas, Lawrence, Kansas, Special Publication 65, October 1972, pp. 7,8.

other crops if the trees in such areas are relatively vigorous and are 20 years old or older.

Fly Ash in Reclamation

The Kansas Geological Survey in cooperation with the Bureau of Mines, Department of the Interior is conducting research utilizing bituminous coal fly ash for neutralizing acid soil on sloped spoil banks. The results thus far definitely indicate that application of fly ash to acid spoil bank soils can alter the pH to the extent that production of grasses and legumes is possible.[16] Whether or not fly ash can be utilized in Southeastern Kansas will depend largely upon the cost of its application compared to the cost of lime application. The cost of fly ash versus lime application is being conducted in order to make this comparison.

Fish, Wildlife and Recreation Developments

About 116 acres in the Thousand-Acre Project were treated for various recreational purposes ranging from private use to income producing enterprises. Most notable income producing recreation developments include those of W. J. "Red" Fox, near Pittsburg; Dorothy Parker's Cottonwood Resort, McCune; and Freddy Van's Cycleland

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[16]William J. Kovacic, The Use of Fly Ash on the Acid Soil of Reclaimed Mined Land, Proceedings, Mined Land Workshop, State Geological Survey of Kansas, Lawrence, Kansas, Special Publication, 65, October, 1972, pp. 26,27.

located northeast of Pittsburg. W. J. "Red" Fox is a legendary name in the Kansas strip pit area. He has done for recreation what Maurice Barnes has done for grassland. "Red" Fox has approximately 600 acres of mined land in two areas which are geared towards recreational use. The main developed area, includes 25 second-home sites, rental cabins, camper hook-ups, showers and restrooms and a large quonset hut sritable for a meeting room. Strip pit fishing is also available. Mr. Fox has one area which is less developed. The ORC demonstration project aided in the preparation of a "wilderness" camping area in this 21 acre site.

Dorothy Parker's Cottonwood Resort, near McCune, Kansas, was opened for camping in the Spring of 1973. Cottonwood Resort is a 70 acre redevelopment on spoilbank mined in the mid-50's. The demonstration project aided in reclaiming 20 acres. A general store and recreation hall, camping areas, showerhouses, restrooms, dump stations, and sewerage systems are available. Tent-only sites are available in areas near the showers and restrooms. A small acreage at one end of the area has been set aside for a local Boy Scout Troop. A heated fishing dock will be ready for Winter 1973-1974. The resort is surrounded on three sides by 12 acres of strip pit lakes.

A sport described by many as the roughest in the world has become a reality in the strip mine reclamation land of Southeastern Kansas. Motorcross racing, an action-packed motorcycle sport, has been

developed on strip mined land northeast of Pittsburg by Fred Van Becelaere. The demonstration project helped reclaim the 36 acre site which is known as Freddy Van's Cycleland. The site contains 4 acres of water area. Income data on these recreation enterprises is not yet available but is expected to be favorable.[17]

Strip Pits Fish and Wildlife Management Area

The Forestry Fish and Game Commission of Kansas manages approximately 6,470 acres of state owned strip mined lands located in scattered tracts in Cherokee and Crawford Counties. The area provides free, multi-purpose recreation including fishing, huntin, picnicking, boating, swimming, and just plain sightseeing. Primary use of the area (72%) is by fishermen even though only about 14 per cent of the area is water, while only 3 per cent of the visitors are hunters.[18] The interest in fishing, no doubt, was prompted to some extent by a colorfully illustrated article in the 1965 issue of True Magazine's Fishing Yearbook[19] and the Commission's "Guide to Strip Pit Fishing and Hunting" complete with maps and other pertinent information. Recognizing access as a major problem, the Commission has built

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[17]Camin, Hardy, Mined-Land Redevelopment, pp. 160-173.

[18]Richard O. Hager, Management Plan of the Strip-Pits Game Management Area, 1972, p. 112.

[19]Byron W. Dalrymple, "They're Mining for Bass in Kansas", True Magazine, 1965.

some fifty miles of roads through the interiors, constructed forty-four boat ramps, sixty miles of foot trails and fifteen miles of fisherman walkways near the water's edge.[20] They have also provided sanitary facilities, parking areas and have carried out various practices ranging from wildlife food plantings to neutralization of acid lakes to help improve hunting, fishing and other recreation activities. Management of strip mined lands for public recreation, including fishing and hunting is a complex undertaking: however, the Forestry Fish and Game Commission appear to be doing an admirable job. Many other strip pit lakes provide fishing and most mined areas provide potential for hunting and other forms of recreation.

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[20]Hager, Management Plan, p. 108.

CHAPTER IX

ECONOMIC ASPECTS OF SURFACE MINE RECLAMATION IN SOUTHEASTERN KANSAS

More than 55,000 acres of land in Southeastern Kansas has been disturbed by surface mining during the last 50 to 60 years. About 43,000 acres of this land has been left to plague local communities with problems of soil erosion, scenic devastation and loss of agriculture production. Historically the resulting problems from surface mining have been treated on an individual basis. Due to excessive costs of reclaiming strip land, little was treated. As the size, complexity and general public concern of the problem grew, new and different approaches to financing the reclamation work were sought. Through the efforts of several local, state and federal organizations and agencies, funds were secured to demonstrate the feasibility of restoring strip mined land to beneficial use. The purpose of this Chapter is to present the economic aspects of the reclamation efforts and the impact of the mining industry upon the economy of Southeastern Kansas.

Economic Observations: Mineral Production

The extraction of a vein of coal 16 to 18 inches thick from 30 to 50 feet below the earth's surface is an amazing engineering feat. That

it can be profitable is still another wonder. Nevertheless it has been taking place in Southeastern Kansas for many years. Since 1964, the yearly average production has been about 1,270,000 short tons valued at $6,542,500.[1] The coal industry in Kansas has employed an average of 235 persons per year during the past nine years. Their average hourly earnings have been $4.85.[2] If coal mining employees are able to work the average work year of 2080 hours, their wages add some $2,370,680 to the Kansas economy. The output of all Kansas industries increases by about $1.85 when the coal industry increases its output by one dollar. Such a relationship is called an output multiplier.[3] The coal industry's average annual output of $6,542,500, then, causes the output of all other Kansas industries to increase by $12,103,625. Another measure of benefit to the region is the impact upon personal income. When all direct, indirect, and induced effects are taken into account, each one dollar in coal production should result in an additional income to households of 33 cents.[4] Those who advocate that surface mining must be stopped at all costs should take these economic matters into consideration.

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[1]Ronald G. Hardy, Personal letter, January 14, 1974.

[2]Ibid.

[3]M. Jarvin Emerson, The Interindustry Structure of the Kansas Economy, Kansas Dept. of Economic Development, Topeka, 1969, p.146.

[4]Ibid., p. 151.

Income to the Landowner

The coal companies have a tremendous capital investment in machinery, and mining equipment. They invested comparatively very little in land prior to about 1960. They leased land whenever possible, paying the landowner for the coal when it is actually mined. Returns to the landowner in Southeastern Kansas range from $600 to $700 per acre. The landowner retains full ownership to the land surface. However, in recent years, the coal operator has purchased the land whenever possible. Prior to the mined-land reclamation law both the coal company and the landowner accepted the fact that the area would be unsituable for agricultural purposes and that actual value would be very low following strip mining. The fact that the leasing price amounted to two and a half to three times the replacement cost of the land had the effect of encouraging many landowners to willingly live with the reality that the land would be virtually destroyed.

Mining vs Agricultural Use of Land

There are many who advocate that we should prohibit strip mining altogether both because of effects of mining on the environment and the fact that it renders land useless for further production. Walter H. Schoewe, in discussing reclamation and income from coal stripping, wrote:

> It is easily demonstrable that coal mining is economically a greater asset to a community than is farming of the same

> land. It is here proposed that reclamation of spoil banks should not be required, if at all, until the revenue for the taxation due to mining are balanced by like income and revenue derived from normal agricultural pursuits. This is based on the theory that only then is land use of the mined and unmined areas comparable economically. On the basis of income to the owners of the coal lands, spoil banks in Kansas could well remain unreclaimed or lie fallow for 22 to 79 years depending upon what crop is raised and in what county.[5]

The owner of a 160 acre tract of land underlain by a two foot seam of coal would have received about $65,000 for his lease to a coal company in 1960. He would have no expense in mining the coal and thus could use the lease money to engage in any enterprise augmenting the royalty income. On the other hand if he had refused to lease his land and devoted it strictly to producing agricultural crops then, on the average prices and production for the 1950 decade, it would require 22 to 79 years to net him a sum equivalent to that received from the coal royalty in a single year.[6] Few would agree with Schoewe that these facts, realistic as they are, are reason to allow strip mined land to remain unreclaimed or left undistrubed for 22 to 79 years before reclamation is justifiable. Leaving the land in dumps following mining is a tremendous waste of resources. It should be pointed out that the thesis of Schoewe's article was not anti-reclamation but rather against mandatory reclamation. Invariably, and probably justifiably so, there are those who de-

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[5]Walter H. Schoewe, "Land Reclamation", Mining Congress Journal, September, October, 1960.

[6]Ibid.

nounce mining and exclaim the need for reclamation on the basis that we must have the land to produce food and fiber for our growing population. A few years ago maintaining the land for agriculture use did not seem quite as pertinent since there were some 64,754 acres in the USDA Soil Bank Program, about 25,000 acres more than were in spoil banks in Cherokee, Crowford, Bourbon and Labette Counties.[7] The Soil Bank Program was designed to remove land from production, so obviously, the spoil bank land was not needed for production.

The outlook has changed considerably. In 1974, a big push for all out agricultural production once again has developed for the nation. The important lesson we learn from this bit of history is that we should always make decisions about natural resource use in a manner that leaves our options open. We should resist making irreversible decisions; irreversible, because even though future generations can correct our mistakes, it can often be done only at a much greater cost.

Economic Impact of Reclaiming Orphan Spoilbanks: Taxes

Land values in the Crawford and Cherokee County areas range between $200 and $250 per acre, with the appraisal value being $150 to $160. The appraised value decreases immediately after mining to $10 per acre in Cherokee and to $40 to $60 per acre in Crawford County. The assessed value in roughly 30 per cent of appraised value and the

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[7] Ibid.

levy averages 85 mills. This means that property taxes on mined land range from 26 cents per acre in Cherokee County to $1.53 per acre in Crawford County. These low tax revenues reflect the current lack of productivity of this land.

Land disturbance caused by mining activity has resulted then in considerable erosion of the county tax base and loss of farm production and income. For example, with the drop in appraised value of approximately 20,000 acres in Cherokee County from $150 to $10 per acre, the county has lost $2.8 million in appraised value, or $840,000 in assessed valuation. In Crawford County, the estimated valuation of 22,000 acres of mined land has decreased from $160 per acre to $40 per acre, representing a loss of $2.6 million in appraised value, or $792,000 in assessed valuation. The tax loss to Cherokee and Crawford Counties amounts to approximately $80,000 per year.[8]

State Representatives Fred Weaver and Richard Ossman, introduced legislation to provide a 5 year moratorium on property taxes if land is voluntarily redeveloped. The Kansas Legislature passed this law in 1971. It states, in effect, that land mined prior to January 1, 1969, and subsequently redeveloped would be reappraised after reclamation takes place, but that the increase in valuation due to reclamation would be exempt from property taxes for a period of five years.

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[8]Camin, Hardy, Mined Land Redevelopment, p. 3.

The purpose of this exemption is to provide a financial incentive for reclamation. The counties have not reappraised any reclaimed land so information is not yet available about the appraised value of redeveloped land.

Reclamation Costs

The reclamation process of converting orphan spoil banks to grassland, involves the following steps: brush and tree removal, sloping or grading, seedbed preparation, line and fertilizer application, and seeding. The following discussion of reclamation costs is based upon information from landowners reclaiming land in 1971 through 1973. The data was assembled by the Mined Land Technical Staff.

Grading and Shaping

The first step in the grading or shaping process on the Southeastern Kansas demonstration plots included bulldozing to the acceptable slope. Maximum slope allowed on 90 per cent of the shaped area was 10 per cent, (10 to 1 slope). Maximum slope allowed on the remaining 10 per cent of the area could not exceed 15 per cent. The second step involved dragging the shaped area with a heavy I-beam. The final process was one disking with a heavy offset disk plow pulled by the bulldozer.

The technical staff of the Mined-Land Task Group has continuously gathered grading and sloping cost data on all demonstration sites.

Cost data on 66 demonstration sites are summarized in Table 7. The average cost of sloping based upon data from the 68 sites involving 1,307 acres was $158 per acre. Six of these sites had abnormally high cost ranging from $237 on the Parsons site to $508 on the Millington site. These abnormally high costs were explained for reasons of inexperienced bulldozer operators, sloping the land flatter than required by the specifications, and one site (Hite) had a box cut adjacent to a public road which required that the spoil material be moved in one direction and hence a greater distance.[9] The estimated direct impact of sloping and grading on regional income is $158,000 ($158 × 1,000 acres) for every 1,000 acres reclaimed.[10]

Seedbed Preparation

Successful plantings on reclaimed land, as on any farming operation, are highly dependent upon good seedbed preparation. Preparation of a seedbed on the reclaimed land consists of disking, harrowing and dragging with farm equipment and rock and brush pick-up. Labor costs of $2.00 per hour were assigned to rock pick-up. A review of Table 7 reveals that seedbed preparation costs varied widely, probably due to the number of operations performed by the individual landowners. Per acre costs ranged up to $47.61. The average cost of seedbed pre-

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[9] Ibid., p. 13.

[10] Ibid., p. 19.

paration on the 747 acres seeded prior to the fall of 1972 was $16.12 per acre.[11]

Lime and Fertilizer Costs

Lime costs taken from Table 7 range up to $41.75 per acre with $8.75 per acre being the average. For all areas which require lime the average cost is $14.69 per acre. This cost includes spreading.

Fertilizer recommendations based upon soil tests resulted in the average application of 55 pounds of nitrogen, 59 pounds of phosphate and 41 units of potash per acre.[12] This is considered the minimum fertilizer application to insure grass establishment. Fertilizer costs on a per acre basis ranged from $5.37 to $26.83 per acre and averaged $12.46 on 700 acres.

Seeding Costs

Almost all cooperators in the demonstration projects have seeded grass, usually fescue, with a nurse crop of either wheat, oats or barley. The nurse crop provides an almost immediate cover thus preventing wind and water erosion and also provides cash income or some grazing during the first year. Seeding costs include both seed and

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[11]The Van Beacelaere Cycleland site required methods differing from the normal seedbed preparation and are therefore not included in the average cost.

[12]Camin, Hardy and Hambleton, Mined-Land Redevelopment, p 19.

Table 7*

RECLAMATION COSTS FOR MINED-LAND DEMONSTRATION SITES

Planting Date	Cooperator	Acres Reclaimed	Dollars Per Acre					
			Grading[1]	Lime	Fertilizer	Seedbed Preparation	Seeding	Total
Spring 1971	Kuplen	40	$126.00	$ 1.38	$14.95	$ 6.30	$ 8.88	$157.51
Fall 1971	Hight	21	125.00	2.32	14.35	9.48	7.61	158.76
	Hite	29	375.98	0	20.39	19.17	12.36	427.90
	Kennedy	16	140.00	10.02	13.62	4.06	7.10	174.80
	McColm	40	120.00	0	15.78	15.00	6.70	157.48
	Parker	20	140.00	0	14.37	16.20	9.98	180.55
	Rogers	28	130.00	0	12.92	43.14	3.80	189.86
	Selburg	7	140.00	16.68	16.94	18.97	16.57	209.16
	Cassidy	21	125.00	41.75	5.37	3.50	8.13	183.75
	Emerson	9	123.00	11.80	20.45	16.77	16.55	188.57
	Epler	40	130.00	0	11.89	25.30	11.03	178.22
	Mussa	40	140.00	26.01	12.55	8.30	9.70	196.56
	O'Malley	11	125.11	13.30	18.23	4.13	12.23	173.00
	Smith	9	125.00	17.44	17.17	17.22	8.17	185.00
	Beerbower	6	183.05	0	10.11	3.00	14.36	210.52
	Bradley	12	162.50	13.18	10.28	8.78	4.26	199.00
	Davis	16	165.00	2.40	15.79	28.14	10.16	221.49

* Source - Mineral Resources Task Group

[1]Grading includes one dragging with heavy I-beam drag and one offset disking.

Planting Date	(continued T. 7) Cooperator	Acres Reclaimed	Dollars Per Acre					
			Grading[1]	Lime	Fertilizer	Seedbed Preparation	Seeding	Total
Spring 1972	Bitner	20	$140.00	$12.01	$ 8.83	$14.10	$ 7.92	$182.86
	Bryant	20	150.00	0	11.78	18.90	11.05	191.73
	Daniels	19	371.60	0	16.49	11.71	8.36	408.16
	Fox, W. J.	16	175.00	0	15.35	23.51	15.49	229.35
	Honsicker	22	162.50	12.00	7.89	13.22	8.16	203.77
	Hostar	13	170.02	12.18	9.87	8.99	6.53	207.60
	Lehman	14	128.66	0	0	0.83	6.71	136.20
	Menghini	19	157.50	12.54	10.87	3.53	4.39	188.83
	Millington	8	508.10	14.63	13.98	8.92	5.07	550.70
	Morgan	9	145.00	25.50	23.66	14.44	9.23	217.83
	Morris	9	162.50	7.52	7.84	8.60	5.00	191.46
	Parson	25	122.42	36.43	7.85	10.36	8.14	185.20
	Romanzi	20	150.00	12.19	8.85	14.80	7.59	193.43
	Stocker	23	185.00	11.38	8.40	16.72	9.90	231.40
	Van Becelaere	32	144.00	11.87	12.18	61.50	7.05	236.60
	Wells	21	140.00	0	0	14.91	8.50	163.41
	Mullen	20	155.00	9.60	8.03	3.55	6.60	182.78
	Potusek	24	130.00	17.29	8.66	8.97	9.19	174.11
	Arnold	9	125.00	0	9.11	12.44	7.86	154.41
	Good	19	150.54	0	11.48	0	10.33	172.35
	Shoemaker	9	150.00	5.10	9.71	42.22	18.00	225.03
	Simpson	11	162.20	12.82	9.35	5.14	9.91	199.42
	Columbia	21	179.59	11.88	21.09	13.33	10.82	236.71

[1]Grading includes one dragging with heavy I-beam drag and one offset disking.

(continued Table 7)

Planting Date	Cooperator	Acres Reclaimed	Dollars Per Acre †					
			Grading[1]	Lime	Fertilizer	Seedbed Preparation	Seeding	Total
Fall 1972	Bryant	18	$150.00	$ 0	$13.23	$24.90	$ 6.77	$194.90
	Kuplen	23	124.89	0	12.38	7.60	9.91	154.78
	Lehman	8	128.66	14.31	7.12	11.45	7.48	169.02
	Massa	6	194.59	13.68	26.83	46.33	14.33	295.76
	Oldham	18	125.00	19.69	10.40	18.82	10.40	184.31
	Barnes, J.	22	125.00	18.15	9.69	12.16	5.88	170.88
	Barnes, M.	27	125.00	18.14	9.31	12.02	11.04	175.51
	Bower	22	325.93	17.36	6.74	8.52	8.23	366.78
	Christiansen, G.	16	125.00	0	15.43	18.07	13.37	171.87
	Epler	26	161.90	0	8.79	15.05	6.40	190.24
	Fowler	61	125.00	0	9.27	13.65	10.49	158.41
	Gaither	30	121.61	34.99	14.18	25.92	8.33	205.03
	City of Galena	24	125.00	0	0	0	0	125.00
	Green	13	125.00	12.91	10.18	4.78	8.85	161.65
	Jones	10	125.00	12.72	13.32	4.42	8.53	163.99
	Poznick	12	130.00	18.15	12.36	28.36	11.15	200.02
	Vandament	21	130.00	0	6.46	4.76	8.31	149.53
	Wilkinson, C.	20	140.00	0	13.42	6.23	9.34	168.99
	Wilkinson, W.	21	125.00	31.29	11.49	9.08	257.73	434.59
	Gross	17	300.00	0	5.09	47.61	28.06	489.69
	Farris	5	125.00	0	8.93	20.88	8.06	162.87
Spring 1973	Fox, Frank	14	160.00					
	Galvani	22	145.00					
	Gebhardt	19	145.00					
	Christiansen, T.	19	124.68					
	Large	14	246.42					
	Wade	21	125.00					
	Parsons	10	237.26					

[1]Grading includes one dragging with heavy I-beam drag and one offset disking.

†All information from Fall 1972 plantings was collected under the ORC's regional (Kansas, Missouri, Oklahoma) mined-land redevelopment program. This program is funded by a grant from ORC to Wichita State University and is directed by Kathleen Q. Camin.

seeding operation. Seeding cost estimated by the Mined-Land Technical Staff were based on machine and man hour costs provided by the cooperators.[13] Seeding costs (seed and seeding) from Table 7 range from $3.80 to $18.00 per acre with an average cost of $9.15 per acre.

A summary of the average reclamation costs per acre for the Mined-Land demonstration sites is shown in Table 8.

Profitability of Converting Mined Land to Grassland

Based upon the experience of Maurice Barnes of McCune, Kansas, it is potentially feasible to restore mined land to grassland for cattle grazing. The first year following reclamation he harvests wheat and fescue. Returns the following years are in the form of beef production and fescue seed. His experience has shown that beginning in the fourth year following reclamation yields of 200 pounds of beef per acre valued at $50 (25 ¢ per pound) plus fescue seed valued at $30.60 per acre for a total gross income of $80.69 per acre can be realized. Cost of production averages $41.84 per acre.[14] The nature of the pay-out consists of a return on the investment of 4.4 per cent by the end of five years by increasing the net income by $41.84 per acre. Barnes' experience was based on a reclamation cost of $151 per acre. Considering the average cost of $208 per acre for reclamation under the demonstration programs and using Barnes' yields, the nature of pay-

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[14]Camin, Hardy, Mined Land Redevelopment, pp. 13-14.

TABLE 8

Reclamation Costs Per Acre For
Kansas Mined Land Demonstration Sites
Average May, 1973*

Item	Number of Sites	Acres	Weighted Average
Grading	68	1,307	$158
Lime (all sites)	61	1,188	9
(Lime users)	38	676	17
Fertilizer	61	1,188	11
Seedbed			
Preparation	61	1,188	15
Seeding	61	1,188	13
Total			$208

*Source - Mineral Resources Task Group.

out consists of a return on investment of 1.5 per cent by the end of six years. By the end of seven years, the return approaches 3 per cent and by the end of eight years, the return on investment exceeds 5 per cent by increasing the average net income producing capability of this disturbed land. (See Table 9 for detailed figures.) The wheat yield realized by Barnes, the first year is probably twice the expected yield on most reclaimed land but the $1.20 per bushel is less than half the price that can be expected today. The beef production per year is in line with expected and realized yields from reclaimed mined land but I doubt that we will ever see 25¢ beef prices at least in the foreseeable future, so returns from beef could easily exceed that realized by Barnes. Although the 5 per cent of return by the end of eight years is rather meager in today's money market, it must be remembered that unreclaimed mined land is dead weight to the landowner. The foregone production is an opportunity cost of holding the land in a unreclaimed condition.

Another important consideration in converting strip mined land to cattle production is the economic impact upon other industries in Southeastern Kansas. The output of all Kansas industries increases by about $2.03 when the cattle industry increases its output by one dollar.[16] So that if output in the cattle industry increased by $500,000

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[16]Emerson, The Interindustry Structure, p. 145.

TABLE 9

Redevelopment of Mined Land for Grassland*
(Based upon Barnes' yields)[15]

Year	Revenue $/Acre		Cost $/Acre	Net Revenue $/Acre
			Reclamation--208.00	-208.00
1	Wheat[1]	69.60		
	Fescue[2]	30.69		
		100.29	45.10[6]	55.10
2	Fescue[2]	30.69		
	Beef[3]	25.00		
		55.69	38.85[7]	16.84
3	Fescue[2]	30.69		
	Beef[4]	37.50		
		68.19	38.85	29.34
4	Fescue[2]	30.69		
	Beef[5]	50.00		
		80.69	38.85	41.84
5		80.69	38.85	41.84
6	Same as above		Same as above	Same as above
7	Same as above		Same as above	Same as above
8	Same as above		Same as above	Same as above

[1]58 bu./acre @ $1.20/bu. (2 yr. wt. ave. yield).
[2]341 lbs/acre @ 9¢/lb (6 yr. ave. yield).
[3]100 lbs/beef/acre/yr. @ 25¢/lb.
[4]150 lbs/beef/acre/yr. @ 25¢/lb.
[5]200 lbs/beef/acre/yr. @ 25¢/lb.
[6]100 lbs available N/acre; wheat harvest @ $5/ac. + 5¢/bu.; Fescue harvest @ $8/acre + 1¢/lb; Hay, 55 bales/acre @ 17¢/bale; $10/cattle unit/yr. labor.
[7]100 lbs available N/acre; Fescue harvest @ $8/acre + 1¢/bu.; Hay 55 bales/acre @ 17¢/bale; labor $10 cattle head/yr.
*Source - Mineral Resources Task Group

[15]Ibid, p. 16.

(10,000 acres X 200 pounds beef @ 25¢ per pound) total output of all Kansas industires would increase by $1,015,000. A second approach to measuring the impact on industries is through the income multiplier. The total additional income resulting from a one dollar change in output in the cattle industry is 71¢.[17]

External Costs of Strip Mining

Thus far one important aspect of benefit cost analysis of strip mine operations and reclamation has been omitted. In calculating benefit cost rations both internal and external costs should be considered. Internal costs are the mine operators costs; external costs are those other than the operational costs and they include the tangible costs such as water pollution by sediment and acid, loss or reduction of surface productivity of the land, plus such intangibles as destruction of wildlife, deterioration of natural beauty plus other sociological and psychological costs that are not recognized let alone quantified. External costs are the essence of the strip mining problem. These are the costs that the community is expected to bear in order to have the mining operation. If we look at the economy as a whole rather than at just a single item, external costs are just as important as internal costs For example, if the mine operator uses the environment as a dumping ground, he is getting free use of a valuable resource for waste dispos-

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[17] Ibid., p. 151.

al, and his internal costs are lowered at the expense of the external costs, the social costs of environmental degradation. Whether reclamation in Southeastern Kansas is privately profitable may be questioned by some, but there is certainly no question as to profitability as a social activity if external costs are taken into account.

CHAPTER X

CONCLUSIONS

No one associated with strip mine redevelopment in Southeastern Kansas is ready to say the problem is solved. There is optimism that never existed before. There is evidence proving that mined land redevelopment can be done and that it si practical. Research is underway that will provide invaluable assistance to landowners and coal companies who reclaim mined lands in the future.

In solving resource problems of this magnitude a vehicle is needed to unite and encourage the efforts of those concerned. In the case of the strip mined lands, reports going back several years indicated the existence of the problem and even offered possible solutions; however, for years lettle was done. This was partly because the problem was viewed with extreme skepticism that nothing could be done, that the cost was prohibitive, and partly because a vehicle for action did not exist. This vehicle seems to have existed over the past three or four years with leadership in the form of the Mined Land Task Group. Many state and federal agencies have lent support to the effort as noted: however, there seems still to be a need for a really solidified, cooperative, organization to direct attention to the problem. I sense the feeling that the RC&D Project "has their program", the Mined Land Task Group "has their project", the Extension Service "has its pro-

ject", and so forth. A true unified continous effort is necessary to solve a problem of this magnitude. The current energy crunch, the increasing thermoelectric needs in Eastern Kansas and adjacent states for coal will add impetus to continued strip mining in the Southeastern Kansas coal field, and with extensive reserves available, surface mining can continue for many years. The Mined-Land Reclamation and Conservation Act will prevent the cumulative disturbance and neglect of the environment which occured in the past. The impact of the reclamation law will be the restoration of and return of future stripped lands to beneficial use.

A pressing question remains: What will be the fate of the orphan spoil banks? The "redevelopment" of some 40,000 acres of stripped lands which were not covered by the provisions of the reclamation law. People in Southeastern Kansas have indeed awakened and more land has been reclaimed (about 5,000 acres) in the past three years then since surface mining began. Mining companies have become increasingly aware of their social obligation to restore the land. While gathering material for this paper, I have come to the conclusion that extreme pessimism toward restoring strip mined land is unjustified and has all but disappeared. It is obvious that attitudes that once prevailed have changed with the enactment of legislation and the installation of the numerous demonstration projects. For many years, it was thought that nothing could be done with the orphan spoil banks, but as D. F.

Bredahl said in a personal conversation, "Now some people want to do the whole job next year."

It appears that at the state and local levels there is a need for a concerted long range effort to correct the "mess" of the orphan spoil. The questions of what and why have been answered. The question of how remains. Sloping the spoil banks seems to be an essential requirement, aesthetically, as well as for creating a more favorable plant, soil, moisture relationship. Sloping represents nearly 80 per cent of the cost of reclamation. At this writing continued federal financial cupport of the Ozarks Regional Commission is doubtful. If the past is any indication of the future, it seems unlikely that extensive acreage of orphan spoils will be reclaimed and redeveloped properly without financial assistance. Economic incentives to achieve the desired goals are clearly necessary. In my opinion, the Ozarks Regional Commission has done an outstanding job, but it is not the only vehicle to accomplish the mission. Revenue sharing offers the greatest hope and opportunity to bring the largest resources available to bear on the problem.

How best can reclamation be accomplished still presents the most serious problem. Is it in the interest of society for government to reclaim private lands? I really believe it is in the social interest to correct these mistakes of the past. Revenue sharing, a broadened tax base, reallocation of state and local resources are all future prospects.

The demonstration projects have shown that private landowners are willing to spend considerable sums of their own money for redevelopment of mined land if some cost-share funds are available as an incentive.

External costs are the essence of the strip mining problem. These are the costs the community or state is expected to bear in order to have the mining operation. As external costs must be borne by the public, they are the rationale for public regulation and public participation in restoring strip mine areas to beneficial use. In addition to cost there exists several technological and engineering problems. Hopefully the demonstration and research programs now underway will provide solutions to many of these problems. Continuous collection of data from these demonstrations is very important. But more important will be a system for transmitting this data to owners of strip mined land and to coal companies who will be responsible for restoring future strip mined areas to beneficial use.

Now that land reclamation has proven feasible, what happens? Of course, we hope that more land will be reclaimed and that the lessons learned in the demonstrations will be used by others. However, it is generally felt nothing of real significance will happen toward reclaiming the stripped lands of Southeastern Kansas until legislation is passed allowing mined land reclamation to receive the same financial benefits and programs as other existing resource conservation programs.

This end should be the overriding objective of future efforts by those concerned with strip mine reclamation.

One question has not been addressed. Why couldn't the State of Kansas provide the needed cost-share that is evidently necessary to encourage land owners to reclaim mined land? Why shouldn't the State provide the needed subsidy? The problem is not solely that of the counties or region but rather is a state problem that should be addressed by the State as a whole. Land resource use and environmental quality have long been major concerns in Kansas. But somehow, for unknown reasons, the critical problem of the orphan spoil banks has been ignored by state officials. The State permitted the strip mining that has resulted in the economic and environmental degradation in the Southeastern Kansas coal fields, thus the rationale for suggesting that the State accept responsibility for correcting the problem. Pursuit of such an objective necessarily involves considerations of other state concerns and improvements and must be approached in conjunction with other state goals. The orphan spoil bank redevelopment must compete with other state needs for economic development.

Consider the costs of reclaiming the remaining orphan spoils: There are about 40,000 acres of stripped land that should be reclaimed. Experience shows that, on a voluntary basis no more than 80 per cent or 32,000 acres would ever be reclaimed. Based on a cost of $250 per acre (allowing for some inflation) $8 million would be required to

finance the total job. All indications point to the fact that landowners will engage in reclamation work if a program providing 50 per cent cost-share is available. Thus some $4 million in state funds would be required. Spread over a ten year period, we are talking about a mere $400,000 per year program cost. These cost-share funds could be derived from the state general revenue sharing funds, from a severance tax on coal presently being extracted, or from a general legislative appropriation from general tax funds. The cost-share funds could be made available to the State Conservation Commission as is presently done for watershed planning and conservation district funds. The Commission could, in turn, distribute the funds to conservation districts in accordance with the relative needs for strip mine reclamation and the readiness of the district to effectively use the funds.

One other possibility for returning orphan spoils to beneficial use deserves consideration. Is it in the public interest for the State to purchase additional areas for recreational use? The demand for outdoor recreation experiences will undoubtedly continue to increase. The growth in demand is particularly apparent for urban area residents, e. g., Wichita, Topeka, Kansas City, who want to "get away from it all". Increasing urban congestion and dwindling in-town outdoor recreational resources increase the desire to escape to recreational areas. The State land use and recreational plans should contain full consideration for State purchase of a sizeable area of strip mined land for pre-

sent and future development into general outdoor recreational areas. Whatever the forthcoming decisions will be in Kansas, they can be based on better information as a result of the demonstration projects. Let us hope that the decision makers will be motivated by concepts that will result in long term environmental as well as economic gains.

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APPENDIX A*

Ownership of Land Disturbed by Strip Mining of Coal
CRAWFORD COUNTY

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Adair, Robert	35-30-24	110	28	27	1
Albertini, Oreste, et al.	27-28-25	450	71	65	6
Amershek, F.	16-30-25	40	30	30	0
Augustin, Colleen M.	2-31-22	156	21	17	4
Baker, Leland	21-30-24	160	86	77	9
Barger, A. D.	36-30-25	100	15	15	0
Bernardi, N.	11-31-24	80	36	36	0
Biancarelli, Richard	34-29-24	79	50	44	6
Bicknell, O. Gene	7-31-25	146	19	19	0
Billington, Ernest	10-31-25	371	71	70	1
Bitner, Robert B.	16-30-25	269	54	54	0
Blaesser, Larry	32-27-25	40	18	17	1
Baggs, Lewis	11-28-24	160	9	9	0
Bogle, George	21-30-24	159	89	81	8
Boore, Annie	11-31-22	437	81	71	10
Boore, Floyd	5-31-24	157	48	48	0
Bowman, W. E.	16-31-23	157	27	18	9
Bray, Mary, et al.	28-29-25	40	40	40	0
Brim, A. M.	32-30-24	320	240	234	6
Browns, Sub	4-31-24	18	18	17	1
Bryant, Robert	3-31-24	92	83	78	5
Buchanan, Dean W.	9-28-25	160	84	75	9
Burkes, Sub	4-31-24	80	55	54	1
Burns, John D. & Jeraldine	33-29-25	79	79	78	1
Careggio, John	33-28-25	166	114	97	17
Cassatt, Oliver	11-29-25	20	17	17	0
Christman, J. & L.	24-29-25	21	15	12	3
Clarkland, Inc.	15-28-25	199	33	29	4
Clarkland, Inc.	34-28-25	238	63	61	2
Clarkland, Inc.	3-29-25	40	24	23	1
Clarkson, J. W.	26-28-25	180	74	74	0
Coonrod, Paul	35-27-24	119	5	5	0
Cramer, Albert	6-31-25	83	12	11	1
Creel, W.	14-31-24	40	40	38	2
Decker, Edgar M.	12-30-25	139	114	114	0
Daniels, Carroll D.	16-29-25	560	560	530	30
Davis, Roy	16-31-23	57	20	20	0
Dixson, Freeman	34-28-25	78	78	77	1
Duncan, Everitt	26-28-25	50	26	26	0
Dunlap, Mable	9-31-24	80	24	24	0
Durgan, F.	11-29-25	17	11	11	0
Edwards, Frank	13-29-25	17	17	16	1
Endicott, George	2-28-25	151	18	16	2
Engle, C. R.	7-28-25	40	30	30	0
Engle, Earnest	26-27-24	152	18	18	0
Evans, John	29-27-25	310	3	3	0
Fauvergue, George, Jr.	21-29-25	150	134	115	19
Fauvergue, George, Jr.	22-29-25	200	155	143	12
Fauvergue, George, Jr.	25-29-25	231	211	197	14
Fauvergue, George, Jr.	27-29-25	160	116	114	2
Fidel, C. & H. Taveranaro	22-29-25	26	12	7	5
First State Bank	27-27-25	240	12	10	2
First State Bank	28-27-25	560	84	75	9
First State Bank	3-28-25	40	23	20	3

*Source – Mined-Land Task Group

CRAWFORD COUNTY (continued)

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Foltz, F. M.	18-31-23	158	58	48	10
Fox, Frank	2-31-22	140	26	26	0
Fox, Frank	11-31-22	154	18	18	0
Fox, W. J. "Red"	3-30-24	160	71	70	1
Fox, W. J. "Red"	9-30-24	120	120	102	18
Fox, W. J. "Red"	10-30-24	240	170	156	14
Fox, W. J. "Red"	16-30-24	175	140	130	10
Gebhardt, Fred	13-29-25	97	32	30	2
Gebhardt, Fred	14-29-25	133	130	120	10
Gebhardt, Fred	23-29-25	378	262	228	34
Gebhardt, Fred	9-30-24	40	40	38	2
Gemmel, Wayne	31-30-23	40	22	21	1
Gemmel, Wayne	1-31-22	1,500	48	42	6
Gendusa, J. D.	23-30-24	40	40	39	1
Gobl, Joe, Jr.	7-28-25	260	26	20	6
Gobl, Joe, Sr.	28-27-25	320	11	11	0
Gobl, Joe, Sr.	31-27-25	80	79	71	8
Gobl, Joe, Sr.	32-27-25	240	167	157	10
Gobl, Joe, Sr.	1-28-24	154	89	85	4
Gobl, Joe, Sr.	12-28-24	157	101	91	10
Gobl, Joe, Sr.	6-28-25	319	278	270	8
Gobl, Joe, Sr.	7-28-25	280	217	215	2
Gobl, Joe, Sr.	8-28-25	320	15	15	0
Gobl, Joe, Sr.	20-28-25	199	23	20	3
Gobl, Joe, Sr.	21-28-25	160	74	69	5
Golob, Robert	27-29-25	80	38	35	3
Green, Lester	12-31-22	195	157	147	10
Guthrie, Lawrence	36-27-25	109	17	16	1
Guthrie, Lawrence	10-28-25	238	104	98	6
Haden, John	5-30-25	17	12	12	0
Haller, Margarite	4-28-25	234	27	20	7
Hercules Powder Company	27-30-24	172	167	159	8
Hight, Donald	21-30-24	320	144	135	9
Hildebrandt, Walter D.	26-30-25	500	21	20	1
Hite, Darrel	5-31-24	340	35	30	5
Hollinger, F.	27-30-25	35	24	23	1
Home State Bank	27-27-25	120	22	22	0
Home State Bank	29-27-25	80	14	12	2
Honsicker, Roy	3-30-24	159	42	32	10
Hostar, William K.	4-30-24	127	63	63	0
Howard, Burt & John	25-28-25	369	73	69	4
Howard, Burt & John	26-28-25	139	53	51	2
Himble, Willis	7-31-24	83	24	22	2
Hurt, Lee	11-30-25	175	46	45	1
Hurt, Lee	12-30-25	175	18	17	1
Huston, H. F.	22-30-24	160	67	65	2
Huston, Lawrence	27-30-24	80	43	37	6
Huston, R. L.	16-30-24	80	30	30	0
Ida, Joe & G. Fauvergue	15-29-29	80	24	20	4
Ida, Joe & G. Fauvergue	4-31-24	107	77	73	4
James, Kenneth	30-27-25	240	4	4	0
James, T. M.	29-27-25	420	39	32	7
James, T. M.	31-27-25	100	16	16	0
James, Tom	32-27-25	40	15	14	1
James, Wesley	31-27-25	240	19	15	4
Jameson, George & Marie	29-30-24	160	42	39	3
Jarvis, Tony	16-31-23	157	35	30	5
Johnston, Neva M.	1-31-22	140	38	34	4

CRAWFORD COUNTY (continued)

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Jones, Frank	11-29-25	27	8	8	0
Jones, Georgia	36-28-25	51	5	5	0
Jones, Josie	9-28-25	80	50	48	2
Jones, Josie	15-28-25	16	16	16	0
Jones, Josie	16-28-25	160	23	18	5
Kays, Leonard & Myrtle	10-31-22	240	66	55	11
K.C.F.S. & M. Ry Co.	12-31-24	224	138	134	4
K.C.F.S. & M. Ry Co.	15-31-24	69	69	67	2
Keck's Sub	10-29-25	30	10	10	0
Kelley, Keith	18-31-23	186	48	42	6
Kennedy, E. G.	28-30-24	155	104	99	5
King, Harry	13-28-25	136	40	38	2
King, Harry	14-28-25	45	45	45	0
King, Ralph	7-30-25	60	10	10	0
Kociolko, Stefania	13-29-25	40	34	33	1
Kociolko, Stefania	14-29-25	40	39	37	2
Koewler, G. Darlene	4-31-24	160	150	147	3
K.S.T.C.	4-31-24	70	70	67	3
Kuplen, Herman "Bud"	15-29-25	465	200	194	6
Lashmet, Ann	9-28-25	319	240	233	7
Legg, W. C.	15-31-24	85	11	11	0
Lehman, Wayne	1-29-25	275	21	21	0
Lehman, Wayne	2-29-25	64	15	15	0
Lindsey, Nellie L.	8-31-24	160	64	57	7
Lindsey, Nellie L.	13-31-24	160	61	60	1
Lindsey, Nellie L.	17-31-24	160	53	46	7
Liston-Clark, Inc.	7-31-25	120	58	55	3
McAuliff, E. M.	34-28-25	80	53	53	0
McAuliff, E. M.	3-29-25	180	76	75	1
McCabe, James	8-31-24	80	80	79	1
McCarty, C. R.	12-30-25	40	24	24	0
McColm, Earl	31-30-23	300	89	81	8
McConnel, N.	13-29-25	26	26	26	0
Marino, Josephine	11-29-25	40	30	30	0
Mark, Adam, Jr.	11-29-25	90	18	15	3
Mattivi, Mat	22-29-25	40	23	23	0
Mechling, Ellen	25-27-24	180	71	71	0
Menghini, Anton	4-30-25	80	70	62	8
Menghini, Anton	7-30-25	160	8	8	0
Menghini, Josephine	4-30-25	88	62	56	6
Mertz, Jim	6-28-25	160	37	34	3
Millard, S. D. & Velma	32-30-24	160	28	27	1
Millington, Howard	14-30-25	411	241	233	8
Montee, Anna	5-31-24	134	6	5	1
Montee, George	11-29-25	53	41	40	1
Montee Sub	3-31-24	80	32	32	0
Morgan, Ernest	23-29-25	133	8	7	1
Morris, Frank	15-31-24	20	20	19	1
Morris, Murl	3-28-25	80	25	23	2
Morris, Murl	11-28-25	75	57	55	2
City of Mulberry	36-28-25	28	5	5	0
Mummert, Jeffery	16-30-24	40	16	16	0
Murdock, Richard	12-28-24	240	13	12	1
Murdock, Richard	7-28-25	40	2	2	0
Mutch, Henry	4-30-24	160	114	106	8
Nardelli, John	15-28-25	210	77	75	2
Nardelli, Mario, Jr.	16-28-25	380	185	166	19
Nardelli, Mario, Sr.	15-28-25	320	159	157	2

CRAWFORD COUNTY (continued)

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Nugent, E. L.	34-28-25	17	17	17	0
Odle, Curly	8-28-25	160	35	35	0
Oldham, H. B.	25-30-24	47	36	31	5
O'Nelio, Virginia	27-30-24	10	10	10	0
Parish, Jeanette	11-29-25	40	20	19	1
Parker, Nelson L.	10-31-22	160	70	56	14
Parrish, John W.	7-28-25	180	64	64	0
Parrish, John W.	9-28-25	550	31	30	1
Parson, Harold	35-28-25	80	31	31	0
Perry, W. C.	10-28-25	80	25	25	0
Perry, W. C.	24-28-25	40	40	40	0
Perry, W. C.	35-28-25	240	122	122	0
Perry, W. C.	1-29-25	44	28	27	1
Perry, W. C.	2-29-25	107	100	100	0
Perry, W. C.	13-29-25	37	31	29	2
Perry, W. C.	24-29-25	36	35	33	2
Peterson, Jessie	36-27-24	120	11	10	1
City of Pittsburg	19-30-25	240	139	137	2
Pagson, George	25-30-24	11	11	10	1
Pagson, George	36-30-24	259	91	83	8
Prasniker, Anton	36-28-25	147	108	104	4
Price, William	1-30-25	95	19	18	1
Pryor, R. E.	8-28-25	78	10	10	0
Reals, William	17-31-24	181	159	156	3
Reda, A.	17-31-24	38	3	3	0
Reichanbach, Clarence	27-29-25	42	38	38	0
Rice, L. & M.	12-29-25	64	23	20	3
Richard, Norah Gene	15-30-25	412	150	139	11
Robins, L.	9-30-24	30	26	24	2
Renn, Cleve	27-30-24	98	10	10	0
Risley, Wiley	8-31-23	40	4	2	2
Roberts, Elmer & Floyd	28-28-25	400	76	71	5
Rodabaugh, Raymond	14-31-24	80	6	6	0
Roettger, Sara Jo	22-30-24	120	40	38	2
Rogers, Lloyd	8-31-23	300	36	29	7
Romanzi, Paul	34-29-24	260	28	27	1
Rosati, Fred	5-30-25	185	30	27	3
Ryan, Kenny	26-28-25	157	59	59	0
Sandidge, Allen	26-28-25	2,500	28	27	1
Sandidge, Allen	34-28-25	80	42	42	0
Sandidge, Fern	35-28-25	18	18	18	0
Schaub, Charles	9-28-25	80	35	31	4
Schaub, Charles	28-28-25	80	41	41	0
Schaub, Charles	33-28-25	116	3	2	1
Schilling, Ralph	27-28-25	160	39	38	1
Schilling, Ralph	28-28-25	600	58	55	3
Schilling, Ralph	34-28-25	60	9	8	1
Selburg, D. & M.	13-30-25	77	13	12	1
Sells, Jess	12-31-24	40	15	15	0
Shearer, Marguerite	34-28-25	96	64	61	3
Simone, Victor	11-30-25	213	73	68	5
Simonson, Helen & Anthony	27-30-25	155	85	85	0
Simpson, Carney, Jr.	1-28-24	160	5	5	0
Simpson, Carney, Sr.	1-28-24	240	3	3	0
Simpson, Carney, Sr.	2-28-24	160	2	2	0
Sipes, Carl	3-30-24	85	58	53	5
Smart, George	2-28-24	240	30	30	0

CRAWFORD COUNTY (continued)

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Smith, Charles	1-30-24	160	11	10	1
Smith, C. W.	2-29-25	21	15	15	0
Smith, Dale	35-27-24	1,900	100	100	0
Smith, E. J.	34-29-24	196	76	73	3
Smith, Ernest N.	16-30-24	199	79	68	11
Smith, Harold	25-29-24	270	64	61	3
Smith, Harry	1-28-24	160	20	20	0
Smith, Howard	36-27-24	80	9	9	0
Smith, Lester A.	5-30-25	35	21	20	1
Smith, R. V.	13-31-24	35	10	9	1
Spurling, A. H.	25-27-24	410	32	29	3
Spurling, John	26-27-24	197	19	19	0
Standlee, Clifford	10-30-25	240	35	31	4
Standlee, Joe	11-30-25	64	64	59	5
Stelle, Bob	29-27-25	80	14	13	1
Stephenson, Myrtle	9-30-24	278	198	192	6
Stephenson, Myrtle	5-31-24	160	47	45	2
Stephenson, Myrtle	8-31-24	240	147	133	14
Stewart, Atlee	11-29-25	29	25	23	2
Stocker, John	1-31-22	335	148	130	18
Stultz, J.	35-30-25	40	21	21	0
Thompson, R. W.	2-31-25	39	25	25	0
Timi, Thomas	5-28-25	720	35	35	0
A-1 Tool	7-31-25	55	23	23	0
Trabue, Tunnell	10-31-22	160	15	13	2
Tracts	2-29-25	110	54	53	1
Tracts	11-29-25	14	8	8	0
Tracts	14-29-25	40	40	37	3
Tracts	21-29-25	22	22	17	5
Tracts	22-29-25	18	15	11	4
Tracts	34-30-24	270	118	114	4
Tracts	4-30-25	120	103	93	10
Tracts	5-30-25	120	75	71	4
Tracts	7-30-25	80	51	51	0
Tracts	17-30-25	100	65	62	3
Tracts	18-30-25	480	141	138	3
Tracts	6-31-25	20	18	17	1
VanBecelaere, Fred	12-30-25	40	35	34	1
Vaughn, Ernest	15-31-24	250	41	39	2
Wade, Thomas	16-28-25	400	36	31	5
Walker, et al.	4-28-25	243	45	40	5
Wells, George	7-31-23	320	144	135	9
Wells, George	18-31-23	160	65	54	11
Wettstein, Leo	27-30-24	17	17	17	0
Wisdom, Ray	27-30-25	40	33	33	0
Wyland, Ted	3-29-25	132	66	66	0
Young Sub	14-29-25	20	20	15	5
TOTAL		46,928	15,424	14,522	902

CHEROKEE COUNTY

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Acme Brick Company	34-31-24	43	5	5	0
Acme Brick Company	3-32-24	40	23	23	0
Allen, Ralph & Lelia, Sr.	34-21-22	146	78	69	9
Barnes, John	34-31-22	76	64	57	7
Barnes, Maurice & Norma	25-31-22	399	244	224	20
Barnes, Maurice & Norma	35-31-22	420	301	283	18
Barnes, Maurice & Norma	36-31-22	640	136	127	9
Barnes, Maurice & Norma	1-32-22	198	131	125	6
Barnes, Maurice & Norma	2-32-22	160	123	112	11
Bowersock, V. J. & F. G.	30-31-24	75	55	53	2
Broughton, H. D. & J. J.	26-31-24	80	15	15	0
Carnahan, Ray & M. Delano	7-33-24	140	8	8	0
Cassidy, Kenneth	6-32-24	160	35	35	0
Christiansen, George	25-31-23	480	383	353	30
Christiansen, George	30-31-24	124	60	49	11
Clugston, D. F.	24-31-23	156	146	132	14
Copenbarger, Minnie	18-32-24	101	89	84	5
Cramer, L. M.	34-31-24	35	14	14	0
Crawford, Daniel	32-31-24	80	67	63	4
Daniels, C. E. & Lena	7-32-25	231	12	11	1
Denham, J. H. & S.	32-31-25	378	157	150	7
Eaton, Charles	23-32-24	120	40	38	2
Eaton, M.	23-32-24	40	40	40	0
Edwards, E. Schreiner	7-33-24	160	87	82	5
Emerson, L. O.	30-32-24	40	9	9	0
Epler, Leon	26-32-22	500	139	125	14
Epler, Leon	27-32-22	20	20	20	0
Epler, Leon	32-32-22	45	35	33	2
Epler, Leon	35-32-22	206	48	41	7
Eyeston, Annie	24-31-22	153	25	23	2
Flannigan, M. A.	18-32-24	52	42	41	1
Forbes, J. & T.	19-32-22	39	3	1	2
Fowler, R. W. & W. L.	22-31-24	102	44	39	5
Frisco Railroad	30-31-24	42	27	19	8
Gaither, John R.	19-32-24	1,766	182	176	6
Gaither, John R.	30-32-24	379	44	42	2
Graham Estate	13-32-23	40	18	18	0
Grant, T. E.	13-32-23	66	6	5	1
Greaver, H. S. & H.	29-32-22	156	150	118	32
Green, R. E. & N. A.	35-32-23	160	83	80	3
Grone, Lloyd	8-32-23	87	5	5	0
Hamblin, L. L.	27-31-24	154	56	56	0
Hamilton, Nellie	31-32-24	112	14	14	0
Handshy, Harold	18-34-24	160	24	22	2
Heistand, F. C.	36-32-23	28	21	21	0
Hiller, G. M.	26-32-23	80	30	29	1
Hurst, Roy	36-32-23	40	16	16	0
Jeffery, P. K.	3-32-24	40	40	37	3
Jessee, P. G. & E. M., Sr.	23-31-24	80	10	10	0
Jones, Gerald & Verda	24-32-24	240	15	13	2
Jones, H. W.	32-32-22	60	50	40	10
Judd, C. V. & D. E.	6-32-22	80	54	53	1
Kapple, L. & M.	24-32-24	40	15	15	0
Kelley, W. Keith, et al.	26-31-22	121	22	19	3
Kierl, G. M. & H. L.	13-32-23	150	87	83	4
Kierl, K. M.	24-32-23	112	53	52	1
King, J. F.	30-31-24	90	42	40	2

CHEROKEE COUNTY (continued)

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
King, J. R.	20-31-24	80	13	13	0
Langerot, Frank Life Est.	24-32-23	22	22	22	0
Larson, A.	3-32-24	240	40	40	0
Lindsey, M.	21-31-23	160	75	65	10
Lindsey, W. M.	20-31-24	40	30	27	3
Lynch, G. E.	2-32-22	80	5	3	2
McKinstry, John	20-32-24	54	14	12	2
Maples, Edward	8-32-24	87	15	15	0
Markley, M. & M.	34-31-22	40	35	30	5
Markley, Merl	27-31-22	24	22	17	5
Markley, Merl	34-31-22	19	19	17	2
Martin, J. & G. & F. & I. Jenkins	4-32-24	78	34	34	0
Martin, Joseph	6-32-24	378	10	10	0
Marvin, Lily	31-32-24	141	23	23	0
Mason, C. C. & M.	23-31-24	160	4	4	0
Mason, D. & V.	24-31-23	159	116	105	11
Mason, H. L.	24-31-23	160	70	61	9
Mason, W. A.	27-31-24	28	7	7	0
Meek, Howard	19-31-23	160	103	97	6
Monahan, Francis	19-31-24	320	36	30	6
Monahan, Francis	30-21-24	366	77	62	15
Mullen, George & Nadine	26-31-22	367	357	340	17
Mussa, John & Joe	5-32-24	800	57	51	6
Naccaratto, A.	20-31-24	33	16	16	0
O'Connell, Ivan	9-32-23	280	20	18	2
O'Malley, Dave	29-31-24	1,200	28	24	4
O'Malley, H. D.	25-32-24	160	4	4	0
J. D. & L. O'Malley	36-31-23	152	54	49	5
N. O'Malley	36-31-23	64	44	42	2
R. C. O'Malley	20-31-24	34	14	12	2
Parise, Mike & Clara	24-32-23	126	13	13	0
Parsons, C. W. & J.	8-32-23	50	7	4	3
Pendleton, M. H.	34-31-22	119	10	9	1
Pickering, Ralph & Marjorie	32-32-22	39	32	21	11
Pickering, Ralph & Marjorie	9-33-22	160	52	51	1
Pinson, B. W. & G.	12-32-22	311	155	130	25
Potocnik, John	28-31-23	516	282	255	27
Potusek, Mike	19-31-24	325	152	135	17
Powell, John	34-31-22	380	21	20	1
Poznick, J. R.	27-31-24	74	34	34	0
Prewitt, G.	28-31-23	160	26	21	5
Price, J.	36-31-23	196	26	23	3
Pugh, A. W.	20-31-24	24	22	22	0
Quesnoy, C. & G.	3-32-24	160	89	81	8
Reda, F.	20-31-24	87	41	36	5
Reals, W. J. & N. L.	19-31-24	40	40	39	1
Reeves, Francis	25-32-23	147	16	16	0
Rennie, L. E.	27-32-22	23	5	3	2
Richardson, C. C.	1-33-21	60	60	56	4
Rinehart, W. A.	22-31-24	310	33	32	1
Ristau, C.	27-31-24	37	22	22	0
Robinson, J. A. & M. G.	26-31-24	155	14	14	0
Robinson, J. E.	7-32-22	225	7	6	1
Robinson, T. W.	36-32-23	12	9	9	0
Ross, S. & F.	24-31-23	160	160	151	9
Ruggen, George J.	24-32-21	198	176	150	26
Ruggen, George J.	25-32-21	640	336	285	51

CHEROKEE COUNTY (continued)

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Ruggen, George J.	36-32-21	280	280	250	30
Ruttgen, G. J.	19-32-22	107	98	81	17
Ruttgen, G. J.	30-32-23	37	37	33	4
Ruttgen, G. J.	1-33-21	40	40	38	2
Ruttgen, G. J.	2-33-21	58	56	46	10
Schartz, H. E.	21-31-23	159	46	42	4
Scott, Lewis & Geneva	19-32-24	38	37	37	0
Scott, R. & N. L.	13-32-24	80	7	6	1
Shiell, W. A.	6-32-22	233	28	25	3
Shideler, H. J.	19-31-23	200	15	12	3
Simone, Jack	18-32-24	700	102	92	10
Smith, H. D. & B. E.	17-32-24	100	29	27	2
Smith, M.	31-31-23	158	22	20	2
Smith, Orval	4-32-23	129	8	8	0
Snyder, Clarence	9-32-23	122	56	53	3
Spencer, C. H. & William	1-33-21	120	92	86	6
Stevens, Howard	24-31-22	160	15	11	4
Stevens, LeRoy	29 & 32-31-23	187	169	167	2
Stocker, John	29 & 32-31-23	185	142	130	12
Sullivan, Emmitt & Ella	4-33-22	275	118	105	13
Theis, J. J. & M.	26-31-24	60	10	10	0
Todd, Sam	24-32-22	80	41	35	6
Tracts	34-31-24	30	20	19	1
Tracts	13-32-23	18	6	5	1
Tracts	23-32-23	30	25	24	1
Tracts	25-32-23	50	50	50	0
Tracts	18-32-24	8	8	8	0
Vandament, D. D. & M. J. Davis	30-31-23	312	151	131	20
Vandament, D. D. & M. J. Davis	31-31-23	322	31	29	2
Velia, M. R.	19-31-23	155	68	65	3
Walker, Robert & C.	18-32-22	79	37	26	11
Walsh, J. J.	13-32-23	42	13	13	0
Weir City	27-31-24	100	86	85	1
Weir, Lila	4-32-24	160	25	25	0
White, T. W.	36-31-23	40	40	37	3
Wilkinson, C.	29-31-24	445	418	395	23
Wilkinson, Windle	24-32-24	80	79	76	3
Williams, F.	25-32-23	80	19	19	0
Williams, Jennie	23-32-23	131	9	9	0
Yagher, Charles	8-32-23	15	5	5	0
TOTAL		26,047	9,484	8,680	804

BOURBON COUNTY

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Albright, Frank	15-26-25	480	4	4	0
Albright, Frank	24-26-25	318	35	35	0
Arnold, Lewis B.	20-26-25	152	32	32	0
Bailey, Cody	15-27-25	180	15	15	0
Bailey, Cody	21-27-25	120	1	1	0
Bayne, W. B.	10-26-25	40	10	10	0
Beerbower, Howard R.	17-27-25	103	31	24	7
Bell, Nettie	24-27-25	190	14	13	1
Beltram, Henry & Alma	27-26-25	313	116	115	1
Brown, Earl	21-26-25	160	9	9	0
Campbell, Walter D.	1-26-24	80	8	8	0
Chesney, W. J., Jr., et al.	22-26-25	232	13	13	0
Clary, Gerald & Joseph	25-26-25	42	11	11	0
Conner, Vessie & Pearl	33-26-25	80	34	34	0
Coonrod, Henry	19-27-25	75	22	19	3
Coonrod, Wesley	12-27-24	160	38	38	0
Coonrod, Wesley	24-27-24	160	27	27	0
DeBacker, Gerald	1-26-24	240	27	27	0
Dougherty, Thomas W.	9-26-25	160	13	13	0
Dunbar, Jess	28-26-25	44	12	12	0
First State Bank, Pittsburg	21-27-25	25	13	13	0
Gobl, Joe, et al.	27-26-25	152	148	142	6
Gobl, Joe, et al.	35-26-25	461	366	359	6
Gobl, Joe, et al.	1-27-25	300	122	112	10
Gobl, Joe, et al.	2-27-25	300	280	274	6
Gobl, Joe, et al.	3-27-25	320	164	158	6
Gobl, Joe, et al.	9-27-25	160	98	96	2
Gobl, Joe, et al.	10-27-25	160	36	33	3
Gobl, Wiefe	10-27-25	160	83	80	3
Golden, W. B.	17-26-25	411	23	23	0
Golden, W. B.	36-26-25	122	19	19	0
Good, Dr. James T.	10-26-25	248	29	28	1
Gross, John C., et al.	16-26-25	320	19	19	0
Gulf Oil Corporation	11-26-25	240	16	16	0
Gulf Oil Corporation	23-26-25	40	6	6	0
Gulf Oil Corporation	23-26-25	40	10	10	0
Gulf Oil Corporation	24-26-25	20	5	4	1
Gulf Oil Corporation	34-26-25	410	61	57	4
Gulf Oil Corporation	3-27-25	70	17	14	3
Gulf Oil Corporation	25-26-25	41	41	40	1
Hunley, Calvin	8-27-25	240	17	17	0
Johnson, Bobbie E.	20-27-25	240	21	21	0
Johnson, Jud	9-27-25	80	5	5	0
Johnson, L. E.	27-25-25	33	27	27	0
Johnson, Lee R.	33-26-25	160	10	10	0
Johnson, Victor	34-25-25	210	18	16	2
Johnson, W. C.	28-25-25	120	10	10	0
Johnston, Burl	9-27-25	159	29	29	0
Johnston, Lee R.	4-27-25	20	6	6	0
Jones, Frank R.	21-27-25	100	19	19	0
Kelley, T. D. & George C., et al.	9-26-25	160	30	30	0
Kelley, T. D. & George C., et al.	17-26-25	154	9	9	0
Korinek, Charles	10-26-25	280	41	41	0
Lakin, Elton	21-27-25	20	7	7	0
Lundberg, Albert	26-26-25	53	15	15	0
McPheron, Ivan	9-27-25	80	7	7	0
Marble, G. W. & Gross, John C.	1-26-24	120	43	41	2

BOURBON COUNTY (continued)

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Water Acres
Marsh, Otto	9-26-25	240	3	3	0
Morilla, Elmer	7-27-25	40	10	10	0
Neil, Rowena	26-25-24	78	11	11	0
Parker, Clyde	26-26-25	80	30	30	0
Peabody Coal Company	20-23-24	460	10	9	1
Pellett, C. E.	28-26-25	40	8	8	0
Pellett, Nina	27-25-25	35	6	6	0
Pellett, Perry & Louise	5-27-25	200	11	11	0
Perry, W. C.	23-26-25	40	7	7	0
Peterson, Mary, Fred & J. W.	11-26-25	160	9	9	0
Pruitt, Ula & Martin	10-25-25	40	10	10	0
Pruitt, Ula & Martin	11-25-25	200	54	54	0
Query, L. B.	16-26-25	160	24	24	0
Rager, Lowell	11-25-25	160	18	18	0
Rager, Verne F.	14-25-25	155	10	10	0
Rourk, Alva	28-26-25	96	33	33	0
Rutherford, Donald	21-27-25	70	31	31	0
Schoonover, C. C., Jr.	9-26-25	150	30	30	0
Schullis, L. A.	26-25-25	17	2	2	0
Shead, Frank B.	23-27-24	160	4	4	0
Shoemaker, Roy	21-27-25	128	30	30	0
Simpson, H. D.	19-27-25	40	20	17	3
Simpson, Hubert & Etta	13-27-24	160	22	22	0
Simpson, Hubert & Etta	24-27-24	280	10	10	0
Simpson, Lynn C.	12-27-24	80	6	6	0
Simpson, S. E.	12-27-24	80	31	31	0
Simpson, Stanley	13-27-24	160	19	19	0
Singmaster, Ralph	2-26-25	298	12	12	0
Sterling, R. L.	18-27-25	39	30	26	4
Thomas, Effie	28-25-25	54	12	7	5
Tract	34-25-25	10	4	3	1
Underwood, Eldon	7-27-25	142	37	37	0
Underwood, Eldon	17-27-25	216	11	10	1
Ward, Ira	23-26-25	119	14	14	0
Watt, C. R. & Sweet, Ray	7-27-25	76	11	11	0
Williams, C. R.	28-26-25	320	26	26	0
Williams, Luann	26-26-25	40	1	1	0
Williams, Verna	26-26-25	39	6	6	0
Wooley, W. H. & Neil K.	23-27-24	160	18	18	0
Worden, C. G. & C. C.	5-27-25	80	8	8	0
TOTAL		14,660	2,991	2,907	84

LABETTE COUNTY

Owner	Location Sec.-T.-R.	Total Acres Owned: Disturbed & Undisturbed	Surface Acres Disturbed by Strip Mining of Coal		
			Total Acres	Land Acres	Wa Acr
Amis, Roy	28-34-21	102	17	14	3
Bryson, W. A.	7-35-21	80	5	5	0
Brogles, C. W.	5-35-21	110	92	90	2
Columbia, Dan	28-34-21	80	67	60	7
Davis, M. O.	18-34-21	160	27	25	2
Domeny, J.	10-34-21	40	25	25	0
Elmore, G. I.	27-34-21	80	51	36	15
Fritz, C. B.	25-34-21	120	20	20	0
Henson, James A.	20-34-21	160	30	30	0
McColey, F. M.	34-33-21	80	25	25	0
Richardson, D. E.	11-34-21	240	73	71	2
Rohmilier, H. C.	27-34-21	80	80	80	0
Shuts, Glen	9-35-21	160	20	18	2
Sonders, R. W.	17-35-21	80	27	26	1
Stice, C. B.	33-33-21	160	92	90	2
Tullis, A. D.	24-24-20	160	20	20	0
Turner, J. A.	16-34-21	160	12	12	0
Turner, J. A.	21-34-21	80	40	40	0
Wade, N. D.	8-35-21	280	26	26	0
Wright, W. H.	21-34-21	320	70	70	0
TOTAL		2,732	819	783	36

APPENDIX B*

Extension Demonstration Program Specifications and Results

AGRICULTURAL ADVISORY COMMITTEE

Major responsibility for the Extension Demonstration Program resided with the Agricultural Advisory Committee which designed the program. The membership of the Agricultural Advisory Committee includes:

Voting Members:

Frank Bieberly, Section Leader, Extension Agronomy, Kansas State University.
Robert Hyde, Extension Specialist, Range and Pasture Management, Kansas State University.
Verlin Peterson, Area Extension Specialist, Crops and Soil, Kansas State University.
William E. Cox, Crawford County Extension Agent.
Raymond E. Wary, Cherokee County Extension Agent.
Leonard Jurgens, Range Conservationist, Soil Conservation Service.
John Shetlar, District Conservationist, Crawford County, Soil Conservation Service.
Tom Badger, District Conservationist, Cherokee County, Soil Conservation Service.
Maurice Barnes, Cattleman, Cherokee County.

Non-voting Members:

J. Parker Craig, State Mine Inspector, Reclamation Inspector—Mined Land Reclamation and Conservation Board.
William Kovacic, Research Assistant, Mined-Land Redevelopment Office, Kansas Geological Survey.
Frank Fox, Reclamation Consultant, Mined-Land Redevelopment Office, Kansas Geological Survey.
Kay Camin, Project Director, Mined-Land Redevelopment Office, Kansas Geological Survey.

COOPERATOR REQUIREMENTS

Each cooperator must have 40 contiguous acres of mined land, which will be accessible for public viewing. He must agree to participate in the program through three grazing seasons. Each cooperator must have a livestock program suitable to the objectives of the demonstration program, and must give evidence of reasonable stability in farming operations. He must be willing to devote time to weighing cattle, provide good fencing, fertilize according to plan, and participate in tours and other public demonstrations of results. A memorandum of understanding between the cooperator and Kansas Cooperative Extension Service is required in order to assure proper grazing of pasture, fertilizer application, recording data, etc.

RECLAMATION GUIDELINES

The following guidelines were developed by the Agricultural Advisory Committee:

Land Shaping:

1. Land shaping or leveling for this project includes one heavy I-beam dragging and one heavy offset disking (similar to the Rhome disk); visual inspection will determine need for a second dragging or disking.
2. Maximum slope allowed on 90 percent of land is 10 percent (10 to 1). Maximum slope allowed on remaining 10 percent of land is 15 percent (6% to 1).
3. All slopes on the area established to grass must be leveled to the degree needed to permit travel with wheeled tractors and the use of conventional farm machinery for grass establishment and maintenance.
4. Livestock access at not greater than 4 to 1 slopes must be provided where existing water is available.
5. Leveling must be planned to maintain or develop livestock water supply.
6. The needed drainage must be provided as a part of the leveling operation.
7. Stumps and boulders must be covered. If trees can not be buried, they must be piled for burning.
8. No trees are allowed except on the perimeter of the plot (and then only on sides not adjacent to roads) or near the water areas.
9. The Soil Conservation Service will stake out or otherwise mark the area to be leveled.

*Source – Mined-Land Task Group

10. The Soil Conservation Service and the Reclamation Consultant from the Mined-Land Redevelopment Office will check slopes and approve the leveling work.
11. Fencing is required around the perimeter of the 40 acres and around test-plot areas.

REQUIREMENTS FOR DEMONSTRATION PLOTS

The major part of each 40-acre demonstration and research plot is to be devoted to demonstrating the feasibility of leveling land and establishing grass, using standard land-treatment methods as follows:

Soil Tests

Soil samples are to be taken by Mined-Land Redevelopment Office staff before and after leveling. A soil sample is a composite of four samples taken on the circumference of a circle whose radius is 2 feet. An average of one sample per 2 acres is taken before leveling; an average of one sample per acre is taken after leveling. The purpose of the soil sampling and analysis with respect to pH, effective calcium carbonate, organic matter, available phosphorus, and available potassium is to determine if soil tests taken before leveling are predictive of soil conditions after leveling, and to determine rates of lime application. A summary of soil tests for the four 40-acre plots is shown in Table

Soil Treatment

The demonstration acreage is to be treated uniformly with respect to lime and fertilizer, using the soil tests as a guide in determining application. Annual applications of nitrogen are made at a rate of 100 pounds per acre. Lime is to be applied as soon as possible before or after the first heavy offset disking.

Seeding

Tall fescue seed is to be applied at a rate of 15 to 20 pounds per acre. With fall seeding, a cover crop of small grain such as wheat and oats can be used. Fall seeding was practiced on three of the demonstration sites; spring seeding was practiced on one of the sites.

Grazing

Grazing of the established pasture can be practiced in accordance with guidelines developed by the Kansas Cooperative Extension Service. A "weigh-in, weigh-out" livestock program must be established to demonstrate the production potential of reclaimed strip-mined land. Grass-seed production also is included in the demonstration.

Records

Records will be kept on the following factors:

1. Itemized cost of leveling and vegetating strip-mined land.
2. Soil tests.
3. Management practices.
4. Annual cost of grass production.
5. Dates livestock grazed, stocking rate, kind, and age.
6. Initial and final livestock weights.
7. Yield of seed.
8. Net returns.
9. Benchmark information—management and returns from similar unreclaimed strip-mined land.

REQUIREMENTS FOR RESEARCH PLOTS

Within each 40-acre plot, relatively small, fenced, research areas will be established to investigate grass-species adaptability, fertility, lime application, and fly-ash application. Treatment of research plots will be replicated three times with respect to each variable, the other variables being held constant.

Species Adaptability

Research to determine the adaptability of various grass species will be undertaken at each research site. The species-adaptability plots will be treated uniformly at each location with respect to lime and fertilizer

application. Acceptable grass species are Achenbach Smooth Brome, Fawn Fescue, Garrisons Creeping Foxtail, Barton Western Wheatgrass, Kaw Big BlueStem, Aldous Little BlueStem, Kanlow Switchgrass, Blackwell Switchgrass, Cheyenne Indiangrass, Osage Indiangrass, Eastern Gamagrass, Sideoats Grama, Midland Bermuda Grass, W_2F_1 Buffalograss, Emerald Crownvetch, and Cicer Milkvetch.

Fertility

Fertility studies will be conducted on 6-foot by 20-foot areas, varying rate of application and chemical composition of fertilizer, with uniform application of lime.

Lime

Lime studies will be conducted on 6-foot by 10-foot areas, with lime applications of 0; 4,000; 16,000; 32,000; and 48,000 pounds per acre; fertilizer will be held constant and applied uniformly.

Fly Ash

Fly ash application studies will be conducted on 6-foot by 10-foot areas; fertilizer will be applied uniformly and held constant.

APPENDIX C

Mined-Land Redevelopment Office
Courthouse, Girard, Kansas
P. O. Box 344
Phone: 316-724-8300

See-Kan RC&D--ASCS
Demonstration Project
Handout #1 5/10/71

Funding:

$85,000 is available to pay half the cost of reclaiming 1,000 acres of strip-mined land in Southeast Kansas to demonstrate that such land can be made productive. $65,000 is a grant from Ozarks Regional Commission to See-Kan RC&D to cost-share the leveling of 1,000 acres. The ASCS State Committee is providing $20,000 of special project funds to cost-share the seeding of the 1,000 acres.

1,000 Acre Demonstration Project

Ozarks Regional Commission	$ 65,500
Landowners	$108,500
ASCS	$ 20,000
SCS (Contributed Services)	$ 26,000
Extension Service (Contributed Services)	$ 10,000
	$230,000

Services will also be provided by the See-Kan RC&D Steering Committee, the Mineral Resources Task Group, The Mined-Land Redevelopment Office, and the State Geological Survey.

Purpose:

This project will: (1) demonstrate the feasibility of converting strip-mined land to grassland or other uses (2) abate pollution of streams (3) beautify the area (4) reduce erosion (5) protect surrounding agricultural lands from damage (6) improve the recreational facilities (7) aid in closing the income gap to persons living in the Ozarks Regional Commission area and (8) provide better information about the economic feasibility of reclamation.

Eligibility:

Anyone who owns strip-mined land in Crawford, Cherokee, Bourbon, or Labette Countie is eligible to apply for cost-sharing. The minimum size of a demonstration site is 5 acres. The maximum acreage to be cost-shared is 20 acres. Most of the demonstration sites will convert mined-land to grassland. Other productive uses of reclaimed land are eligible; i.e., recreation, housing developments, solid waste disposal, etc.

Application:

Applications must be received by July 1, 1971. Forms can be obtained in the Mined-Land Redevelopment Office in Girard and in the SCS offices of the four counties. Completed forms can be turned in to the same places. The staff of the Mined-Land Redevelopment Office will assist people wishing to submit applications.

ıe county soil conservation district boards will approve or disapprove ɔplications for leveling or smoothing. The ASCS county committee will approve ıe seeding funds. SCS will furnish technical assistance to the project.

ɔst-Sharing for Leveling on Grassland Projects:

ɔst-shares will pay fifty percent of the cost of leveling or smoothing mined-ınd not to exceed $62.50 per acre.

ɜveling is defined to include one heavy offset disking and one I-beam dragging.

ɔojects Other Than Grassland:

ɔ guidelines have been developed. Each project will be dealt with individually. ıe maximum cost-share for any project will not exceed $1,250.00.

ƧCS Cost-Sharing:

ıe ASCS Cost-Sharing will be at the fifty percent level and details will be made ɣailable in the near future. In general, it includes a second dragging and ɜavy offset disking, lime, fertilizer and seed.

.stribution of Acreage Among Counties:

ɔreage has been tentatively distributed among the four counties on the basis of ıe distribution of mined-land owned by individuals. This preliminary distribution .locates 470 acres to Crawford, 340 acres to Cherokee, 100 acres to Bourbon and) acres to Labette.

ɔreage may be reallocated on July 1, 1971, depending on demand.

Mined-Land Redevelopment Office
Courthouse, Girard, Kansas
P.O. Box 344
Phone: 316-724-8300

See-Kan RC&D
Demonstration Project
Handout #2 5/10/71

Land Shaping Guidelines for Reclaiming Mined-Land to Grassland:

1. Land shaping or leveling for this project includes one heavy I-beam dragging and one heavy offset disking (similar to the Rhome disk).
2. Maximum slope allowed on 90% of land is 10% (10 to 1).
   Maximum slope allowed on remaining 10% of land is 15% (6-2/3 to 1).
3. All slopes on the area to be established to grass will be leveled to the degree needed to permit travel with wheeled tractors and the use of conventional farm machinery for grass establishment and maintenance.
4. Livestock access at not greater than 4 to 1 slopes will be provided where existing water is available.
5. Leveling will be planned to maintain or develop livestock water supply.
6. The needed drainage will be provided as a part of the leveling operation.
7. Stumps and boulders must be covered.
8. In general, trees may remain only on the perimeter not adjacent to the road or near the water areas or as determined by the SCD Board.
9. The Soil Conservation Service will stake out or otherwise mark the area to be leveled.
10. The Soil Conservation Service will check the slopes and approve the leveling work.

Soil Samples and Tests:

Soil samples will be taken after leveling is completed. An average of one soil sample per acre is required. Each soil sample will be a composite of four samples taken at a depth of 6-8 inches on the perimeter of a circle where radius is two (2) feet. If soil sampling and testing is not provided by the Mined-Land Redevelopment Office, the cooperator will collect the samples as directed and pay the county Extension office for soil testing.

Soil Treatment:

The demonstration acreage will be treated uniformly with respect to lime and fertilizer. Soil tests will be used as a guide by the county agricultural extension agent in determining lime and fertilizer application. Annual applications of nitrogen will be made at the rate of 100 pounds of N per acre.

Lime should be incorporated as soon as possible before or after first heavy offset disking.

APPENDIX D

KANSAS GEOLOGICAL SURVEY
Mineral Resources Section

The University of Kansas
Lawrence, Kansas 66044
913-864-3906

1930 Avenue "A", Campus West

September 26, 1973

Mr. John W. Tippie
2308 Cloverdale Drive
Missoula, Montana 59801

Dear John:

I will try to answer your letter of July 19th as concisely as possible.

The Survey staff has had a recognizance of the reclamation problem for a number of years as indicated by the copy of the attached letter and article. This condition existed for some time, particularly since the Kansas Survey has no regulatory powers.

However, with the passage of the Kansas Mined Land Law which stated that one of the Mined Land Reclamation Board members should be a Survey staff member, the Survey of necessity shifted from a passive to an active role. Furthermore, the Governor through the urging of interested citizens, appointed a Task Group to motivate reclamation of orphan spoils and at the same time created a laboratory to test reclamation theories and obtain hard cost data. The Survey was selected by the Task Group members as the agency to direct this project and handle any monies (we eventually had about $200,000 in grants for staff and setting up test plots.)

Basically the Survey filled three roles in the Task Group operation: (1) administration, (2) finance handling and bookkeeping, and (3) technical support, i.e., geologists, computer assistance, and similar functions. All effort by the Survey was contributive services for which the Survey received no reimbursement. For example, the first year we received a grant of about $30,000; the Survey contribution in services amounted to about $15,000. The two subsequent years we received approximately $50,000 each year and again the Survey's services amounted to close to $25,000. The grant money, from the Ozarks Regional Commission, was for technical services only, mainly salaries. In addition, the O.R.C. made funds available through the Kansas Extension Service at Manhattan and the SeeKan RC&D to be used on a matching basis with land owners to establish test plots for research and demonstration.

The overall success of this project was sufficient to encourage the O.R.C. to establish a four-state Task Group and enlarge the entire scope

of the project. When this was done the Kansas Survey felt its mission was accomplished and the work could best be carried on at the appropriate local levels.

If I had this to do over again, I believe I would follow the same pattern. To begin with we laid down some ground rules as follows:

(1) Task Group members were told they were expected to serve as requested and if they were reluctant to do so we preferred they not join the group and we would seek others who would do so.

(2) We made it plain that we were not interested in merely making conversation. The only people we were interested in talking with would have one or all of the following: money, land, or manpower to contribute.

In addition:

(1) The Task Group should have a small membership, preferably 5 or 7 members.

(2) We immediately contacted the news media and kept them advised of activities. They were of immense help.

(3) Not everyone agrees with everything that is being done which is to be expected, but nothing succeeds like success.

(4) I am a strong believer in the innovator--follower syndrome which I am sure you are familiar with. A strong innovator is almost a necessity and can stop a great deal of opposition or suspicion.

(5) As you might suspect, the name of the game is money so that reclamation will proceed only with financial help or by law.

(6) Maybe we were lucky, but we had excellent cooperation from local, county, state, and even federal agencies. Believe it or not the principal hang-up would come about when some group was not properly recognized for having participated. I must say that federal agencies violated this most frequently.

For your further information I am sending you a copy of our final report. If I can help you further please do not hesitate to ask.

Cordially yours,

Ronald G. Hardy, Chief
Mineral Resources Section

RGH:jb

KANSAS GEOLOGICAL SURVEY
Mineral Resources Section

The University of Kansas
Lawrence, Kansas 66044
913-864-3996

January 14, 1974

Mr. John W. Tippie
2308 Cloverdale Drive
Missoula, Montana 59801

Dear John:

Herewith is listed the Kansas Quantity of Coal and values for the past several years. Also, I noticed that bituminous coal contributes $3.70 per ton to railroad transportation, the average hourly earnings are $4.85, and the average number of employees in Kansas is 235. These are some figures that might be useful in evaluating the impact of the coal industry in southeast Kansas.

I hope that this information will be of assistance and if you need further help, please let us know.

Very truly yours,

Ronald G. Hardy
Chief

RGH:db

Encl.

KANSAS COAL
PRODUCTION AND VALUE

	Quantity (1000 Short Tons)	Value (1000 Dollars)
1964	1,263	5,749
1965	1,310	6,072
1966	1,122	5,355
1967	1,136	5,294
1968	1,268	6,526
1969	1,313	7,108
1970	1,627	9,102
1971	1,151	6,579
1972 preliminary	1,230	7,040

Expenditures by Bituminous Coal Industry

Transportation (RR)	Per ton	$3.70
69.2% by rail		
Average Hourly Earnings		$4.85
Average number employees, Kansas		235

State Conservation Commission

ROOM 406, MILLS BUILDING TELEPHONE (913) 296-3600 TOPEKA, KANSAS 66612

December 27, 1973

Mr. John W. Tippie
2308 Cloverdale Drive
Missoula, Montana 59801

Dear John:

You asked in your recent letter for my comments on the operation of the Kansas Mined-Land Conservation and Reclamation Law. I feel that it has been and is continuing to be successful. When compared to the conditions existing prior to the January 1, 1969 effective date of the law, one could only reach such a conclusion.

Many people were involved in the efforts to obtain a law to regulate the coal stripping in Kansas. While in some respects their efforts were coordinated, the various camps certainly had separate ideas and different objectives. The mining companies appeared at various times to be in communication and harmony with all of the camps and occasionally were obviously completely on the outside making strenuous efforts to kill the entire effort.

I would say that the mining companies are cooperative but the degree of co-operation changes from time to time and from company to company. This may, in part, be explained by some companies being locally owned and operated and others being only a part of a gigantic corporation whose top offices are far removed.

The Mined-Land Conservation and Reclamation Board has encountered difficulties in administering the law. None, however, are insurmountable and while some are attributable to minimal company cooperation, many are due to the lack of information and experience on the part of all concerned. There is need to improve techniques for using conventional mining and earth moving equipment to accomplish the combined stripping and reshaping operation or to come up with new types of equipment. Likewise, there is still need for new plants and planting techniques which might better achieve both temporary and permanent cover on the reclaimed land.

Cost of reclamation varies a great deal with the depth of the mining operation, pit widths and character of overburden so that no precise cost figures are available. We also find the mining companies something less than open about their operating costs. I would estimate, however, that reclamation costs for lands strip mined in Kansas would average from $200 to $500 per acre.

Should you have other questions, please write. Best regards.

Sincerely,

C. F. Bredahl
Executive Secretary

CFB:lb

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 37, Girard, Kansas 66743

October 12, 1973

Mr. John W. Tippie
2308 Cloverdale Drive
Missoula, Montana 59801

Dear Mr. Tippie:

In answering your letter on strip mine reclamation problems in this area I checked TAP minutes on file which date back to March, 1963. Enclosing copies of minutes referring to reclamation. In actuality TAP did not take an active part in reclamation of old mined land or in the efforts put forth by the Soil Conservation District Boards and others in getting the present Kansas Mined Land Reclamation law passed. In general, over the years, the SCS in Crawford County concentrated its efforts on undisturbed agricultural land.

I am also enclosing some correspondence and report made of strip mined land planting just across Kansas-Missouri line near Mindenmines, Mo.

Dee Abbott, Robert Lippett, Leonard Jurgens, Roy Davis and others visited this Missouri project at a later date. Dee Abbott and others spent some time in Cherokee County evaluating SCS plant materials planting on P and M Coal Co. strip mines. This area was not smoothed. I do not have information on Abbott's activities or Bondys if he had any.

Leonard Jurgens and Robert Lippert should have on file materials concerning Cherokee County trial planting.

I have a report made possible through cooperative efforts of an Inter-Agency Committee headed up by Abbott. See xerox copies.

You might say that nothing happened on redeveloping old strip mined land until Dr. Kay Camin and group arrived on the scene. People such as W. J. Fox had been knocking the tops off the dumps, planting sweet clover and lespedeza and later fescue. I instigated some aerial seeding of switchgrass and fescue on Bud Kuplen's strip mined area which since has been smoothed.

Maurice Barnes of Cherokee County in southeast Kansas was the only one who had made a success of leveling dumps and converting to fescue pasture.

Approximately 80 acres of dumps were smoothed in 1956 and 1957 as part of a farm in northeast part of Crawford County. I pulled soil samples on this area. The reclaimed area was limed, fertilized and seeded to fescue. Maintenance was neglected and much of reclaimed area has reverted to broomsedge, blackberries, bluestems, sumac, etc. This farm was rented and original owner and operator left the area which is one of the reasons for lack of maintenance.

Scattered tree planting, chiefly conifers for Christams trees, have been made under SCS and Extension Service encouragement on unsmoothed dumps.

Walnut trees were planted earlier on partially levelled dump by NYA and CCC. An orchard and vineyard was established west of Pittsburg in 1940-41 by NYA under supervision of Fred P. Eshbaugh who was with the Soil Conservation Service at that time and stationed at Manhattan.

This area was eventually turned over to Kansas State College of Pittsburg and neglected as far as fruit production. It was still in good condition as late as 1950.

The Forest Service at one time had an office in Pittsburg and made several experimental plantings in Kansas and Missouri. In Crawford County they have been lost and abandoned.

In past the cost of machine work for smoothing and low value of undisturbed land gave little incentive for reclaiming land. Recent high land values, scarcity of land for sale plus experience gained from current reclamation efforts have stimulated land owners to reclaim their strip mined land without subsidies.

Please contact us for additional assistance if you think we can help.

Sincerely,

John A. Shetlar

John A. Shetlar
District Conservationist

ɔoperative
EXTENSION SERVICE
Kansas State University

Division of Extension
Extension Agronomy
Waters Hall
MANHATTAN, KANSAS 66506
Phone: 913 532-5776

"Taking the UNIVERSITY to the

October 11, 1973

Mr. John W. Tippie
2308 Cloverdale Drive
Missouri, Montana 59801

Dear John:

I'm sorry to be so late in replying to your request for information on the strip-mine reclamation efforts in southeast Kansas. I haven't had much office time recently.

I am enclosing a June 1, 1971, and September 1, 1971, progress report on the project and a final summary report. These will give you some of the information you requested. I would appreciate having the June 1 and September 1 reports returned to me.

Kansas passed a Mined-Land Conservation and Reclamation Act which went into effect on January 1, 1969. This act, as you know, required the coal mining companies to return the mined land to productive use. Land mined prior to January 1, 1969, did not come under this law and this was the real concern which lead to our efforts in the stip-mine area.

A mineral resources task group was appointed by the Governor to stimulate or initiate effort toward reclaiming the approximately 45,000 acres of mind land which did not come under the law. The task group employed a technical assistance staff to direct the work. This staff was headed by Dr. Kathleen Camin, an economist at Wichita State University. After approximately 18 months of activity, Dr. Camin contacted the Extension Service and asked us to initiate some research-demonstration projects to get things moving.

Your question on our commitment is outlined in the enclosed reports. We have, perhaps, devoted more time to the project than is indicated in the report.

Our demonstrations are quite successful. Considerable additional land has been reclaimed by RC&D and by individuals on a cost-share basis with funds provided by the Ozarks Regional Commission. These funds are no longer available.

You asked if there were any conflicts since several state and federal agencies were involved. In Kansas the Extension Service, Soil Conservation Service, and Agricultural Stabilization and Conservation Service have had a long history of working together in harmony. I think I can say that the same cooperation between these three agencies existed in this effort. Frankly, I was not completely happy with our joint efforts with some of the other agencies involved. I think it was a case of too many cooks. If I were to begin over again with these particular groups, I would want a written memorandum of understanding so that our total effort could be expended in a more organized way.

Our demonstrations are established and we are accumulating records on costs and returns on this reclaimed land. I think we did some good and we will continue to use these demonstrations in promoting reclamation of mind land.

If you have further questions, feel free to write.

Sincerely,

Frank G. Bieberly
Section Leader
Extension Specialist
Crops and Soils

/cb

Enclosure

Griffin
Tippie
Wentz
Stratton
Hagen
Ross
Robertson
Smith
Stewart
McBee
Fenwick
WPS
Gehrt

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE
2601 Anderson Avenue
Manhattan, Kansas 66502

June 14, 1973

To: John W. Tippie
Assistant State Conservationist
SCS, Salina, Kansas 67401

From: Kansas State ASCS Office

Subject: Information on REAP Special Project on Seeding Leveled Mined Land in Bourbon, Cherokee, Crawford and Labette Counties

Enclosed are copies of the material on the special project for seeding leveled mined land you requested.

We estimate about 1,000 acres of leveled mined land was seeded with cost-sharing using the regular A-2 specifications prior to approval of the special project and the development of separate specifications for seeding leveled mined land. Generally, good results were obtained from these seedings which consisted mostly of tall fescue. Spring seedings gave the poorest results and some early over grazing occurred which delayed forage production.

Field observations on these seedings indicated a need for more surface mulch as soon after seeding as possible. The use of winter wheat as a nurse crop gave best results. The winter wheat nurse crop provided needed mulch, delayed grazing and gave farmers an early return on their investment.

We think the special project seedings were successful in demonstrating how pollution from strip mined land can be controlled by converting the land to productive pasture. We believe the specifications and technical guides for leveling, seeding and management of established pastures can be improved by a joint agency field study of the seedings that have been made.

The special project seedings were on old spoil banks and the same results cannot be expected on new spoil banks. The treatment of newly mined land is a more difficult problem because of the higher acid levels. I am still of the opinion a system of stockpiling and topping out with top soil is needed.

Good luck to you on your paper. Hope this is the information needed. Let us know if there is anything additional needed from our files.

Lester R. Branson
Agricultural Program Specialist

Enclosures